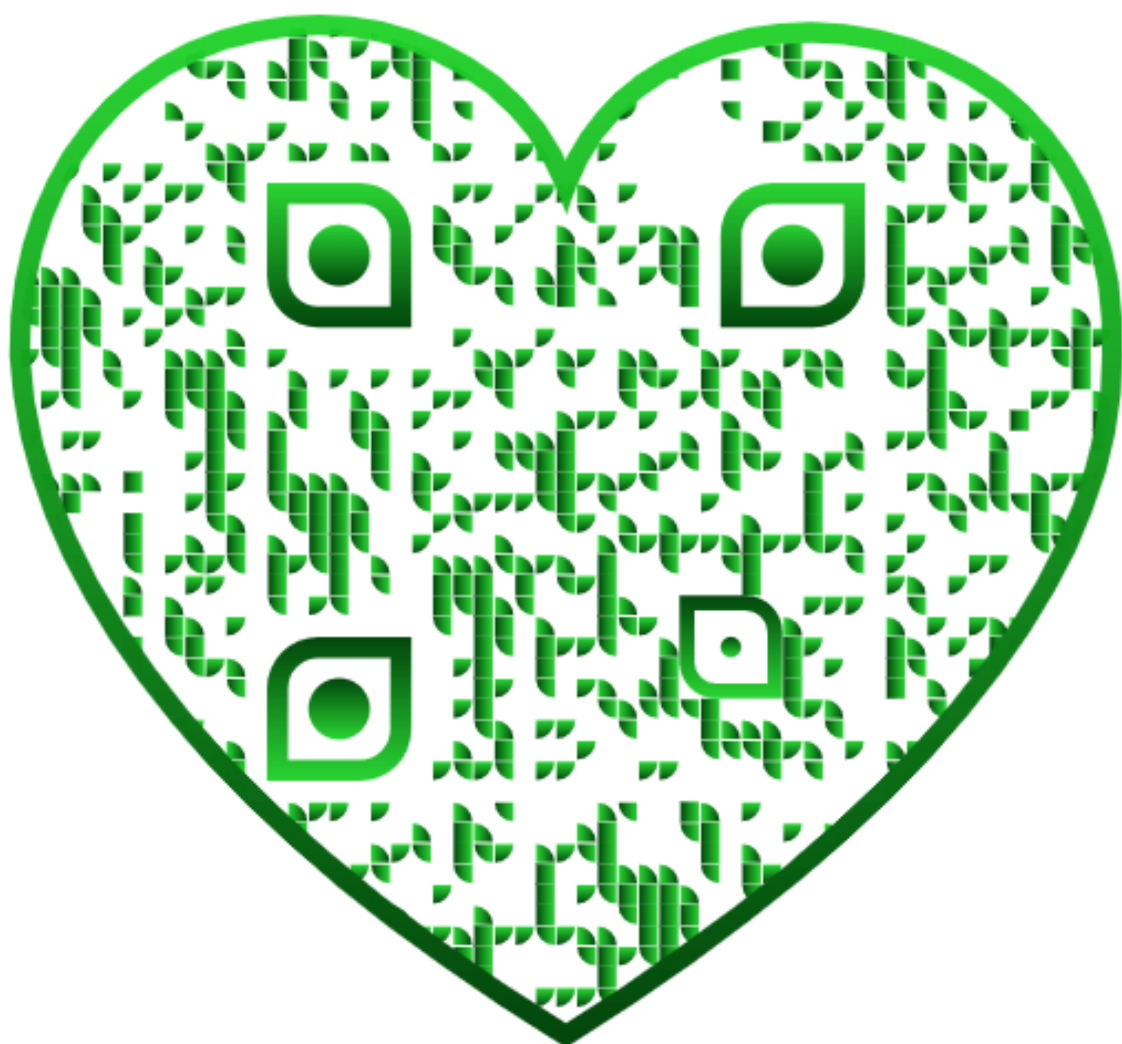


Revision 2016



Ophthalmology Academic Staff *2015 - 2016*

- *Prof Tawfik AlKhatib
- *Prof Abdulmoghni AlBarrag
- *Prof Mahfouth Bamashmus
- *Dr Mutaher AlShaer
- *Dr Horia AlAnsi
- *Dr Ahmed AlAsbahi
- *Dr Amal Noman

- *Prof Talal Haider
- *Prof Aziz Shaher
- *Dr Adnan Thabet
- *Dr Saleh AlAkily
- *Dr Ibrahim AlWazeer
- *Dr Samiha AlEryani

Good Luck for all students

Muscle (strabismus) hook

Le

ok)

It is a flat metal l
the curve is kno
the curvature of

t one end. Tip of
is at right angle to

Ophthalmology Instruments

- Presented By –
- Dr.R.R.Deshpande



7/10/2015

Phd Dr.R.R.Deshpande

1

Uses:

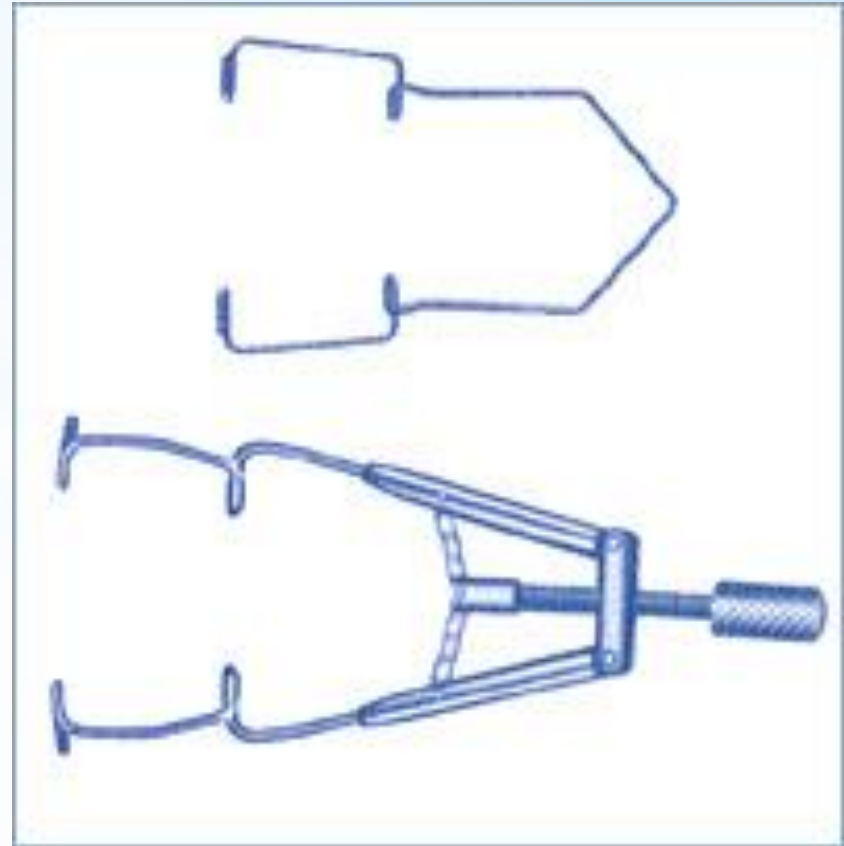
1. To apply pressure on the limbs at the 6 O'clock position during the delivery of lens in intracapsular cataract extraction with Smith's (tumbling) and capsule forceps techniques.
2. To express the nucleus in extracapsular cataract extraction.
3. It can also be used as muscle hook if the latter is not available.
4. Also used along with wire vectis to extract out the dislocated lens.



Surgical Instruments

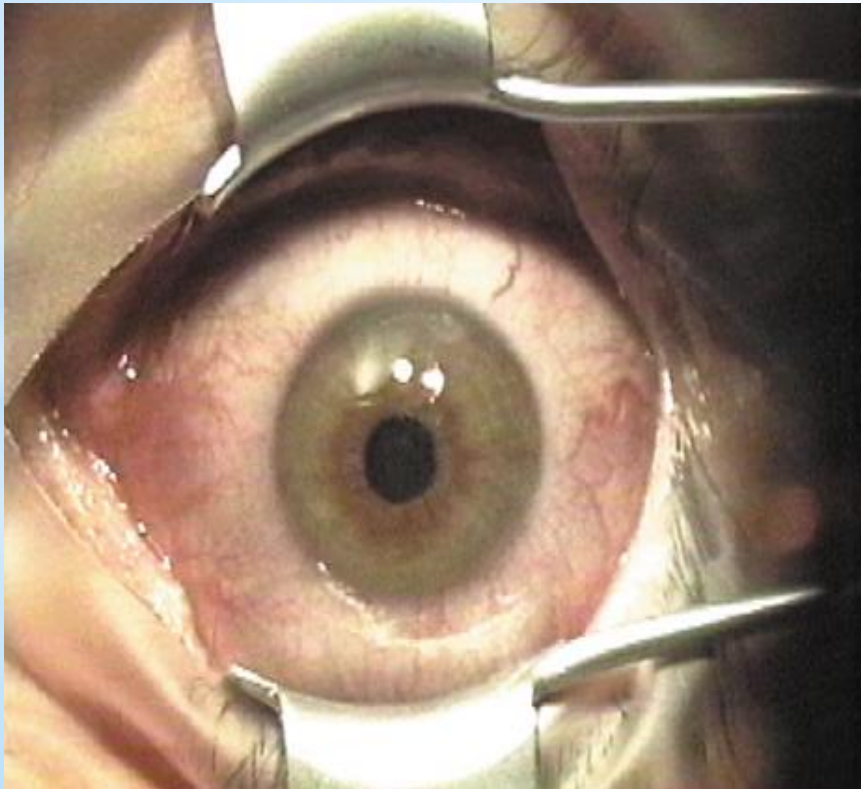
Speculum

Used to retract the lids in ocular operations



Speculum

Used to retract the lids in ocular operations



Desmarre's Lid Retractor

Produces eversion of upper lid



Desmarre's Lid Retractor

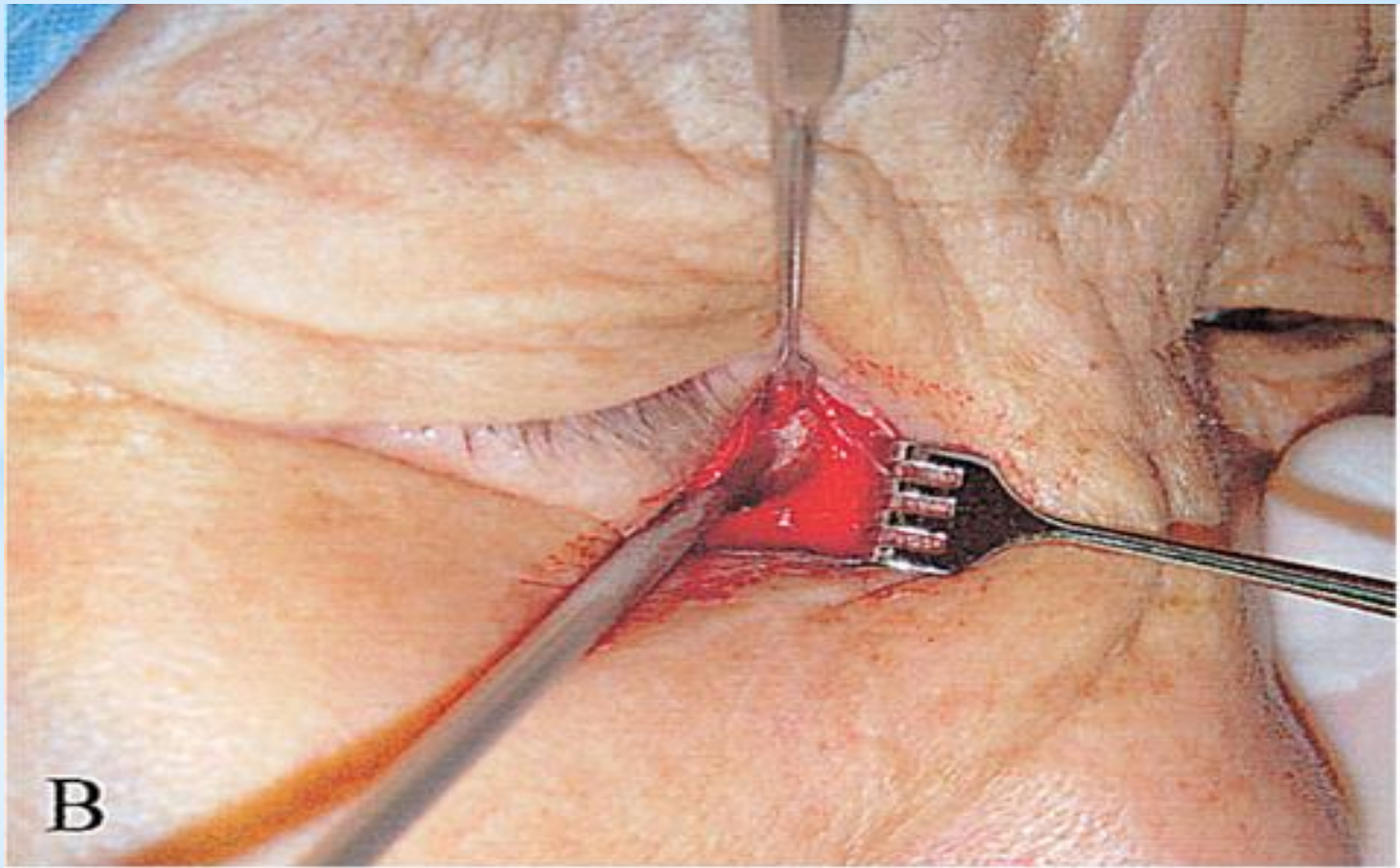
Produces eversion of upper lid



Lacrimal Retractor



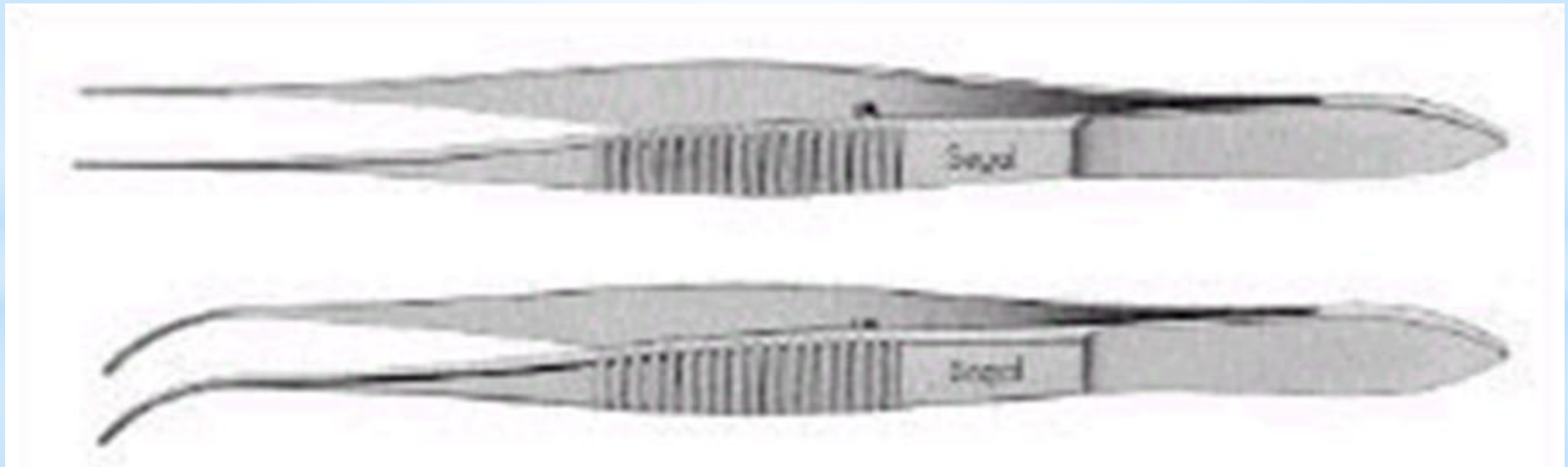
Lacrimal Retractor



FORCEPS

- * Corneal Fixation Forceps
- * St Martin Tooth Forceps
- * Colibri Forceps
- * Mc Pherson Tying Forceps
- * Capsule Forceps
- * Capsulorrhesis Forceps
- * Chalazion Forceps

Corneal Fixation Forceps



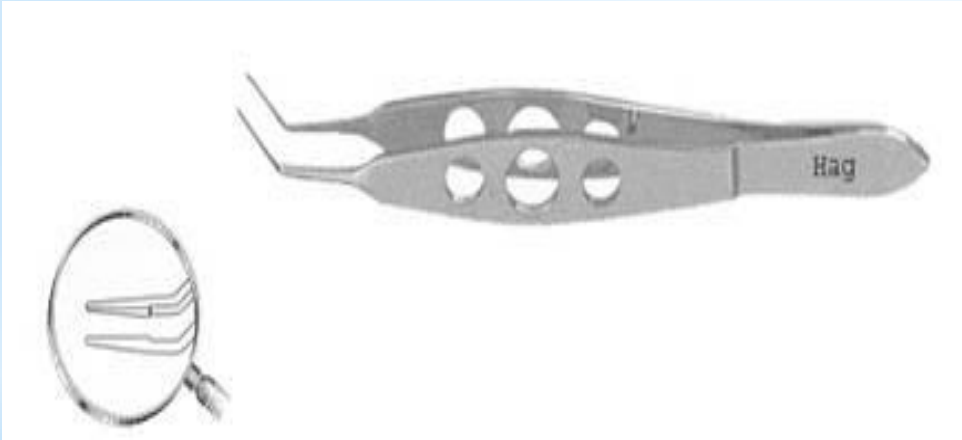
St Martin Tooth Forceps



Colibri Forceps



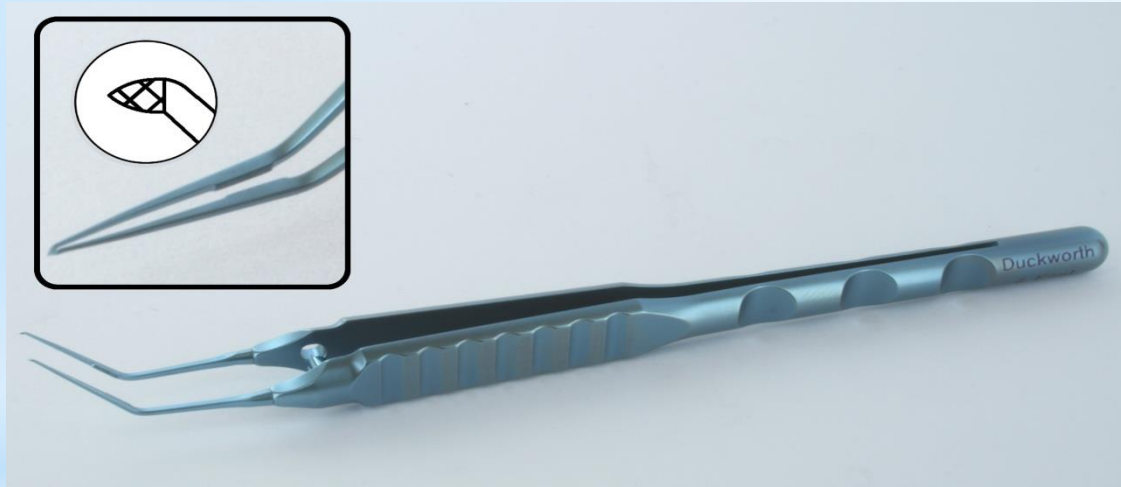
Mc Pherson Tying Forceps



Capsule Forceps



Capsulorrhexis Forceps



Chalazion Forceps



Chalazion Forceps



Chalazion Forceps



Scissors

- * Strabismus Scissors
- * Enucleation Scissors
- * Westcott's Corneal Scissors
- * Catroviejo Corneal Scissors
- * De Weckers Iris Scissors
- * Vannas Scissor

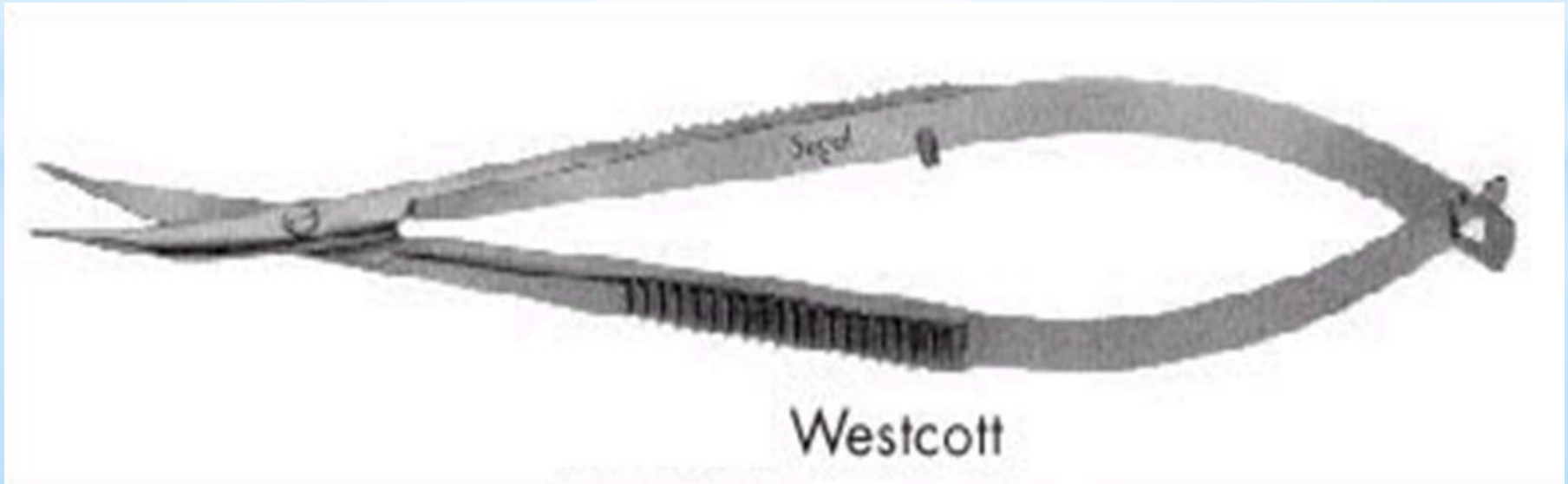
Strabismus Scissors



Enucleation Scissors



Westcott's Conjunctival & Corneal Scissors



Catroyiejo Corneal Scissors

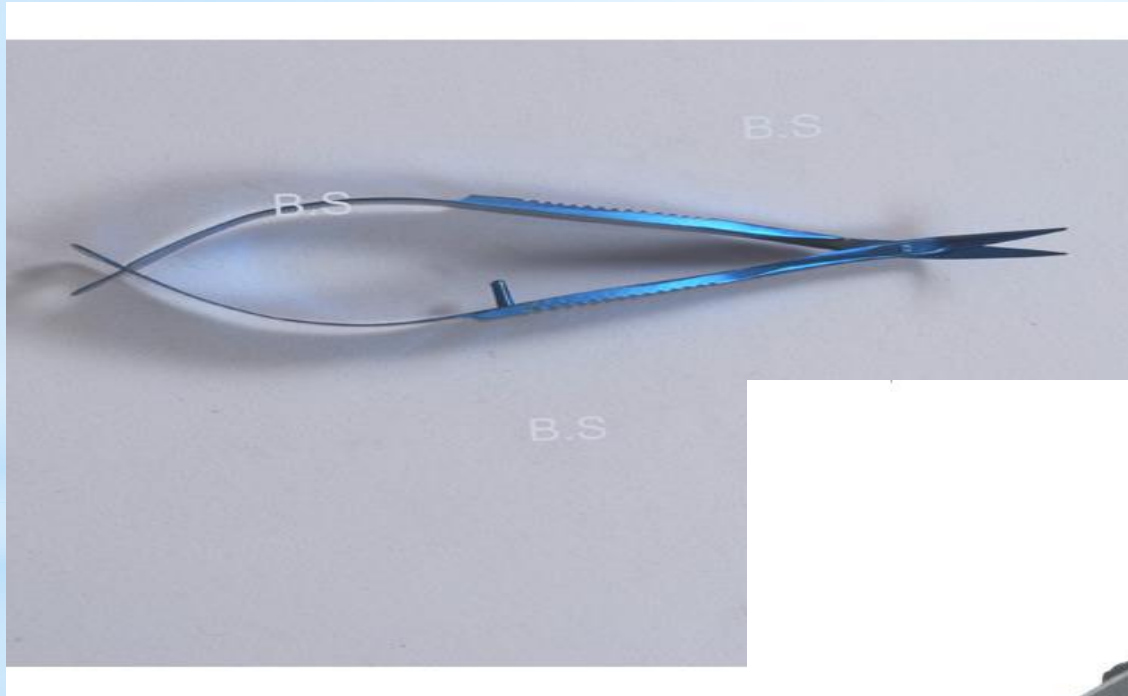


De Weckers Iris Scissors



De Weckers

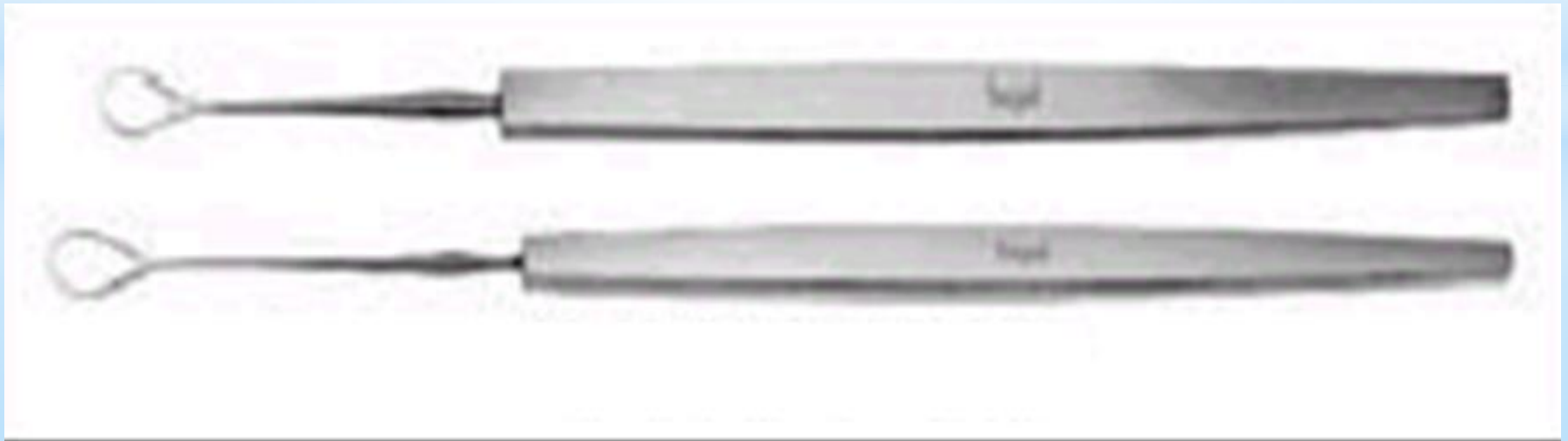
Yannas Scissor



Needle Holders



Lens Scoops



Chalazion Scoop



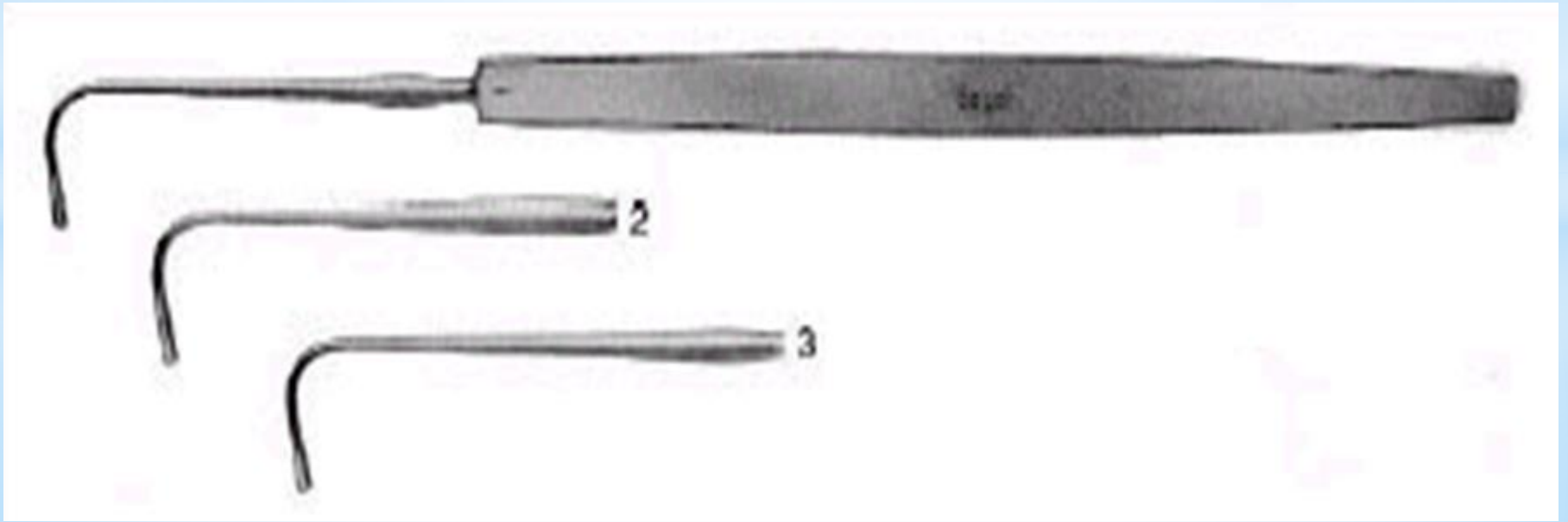
Calipre



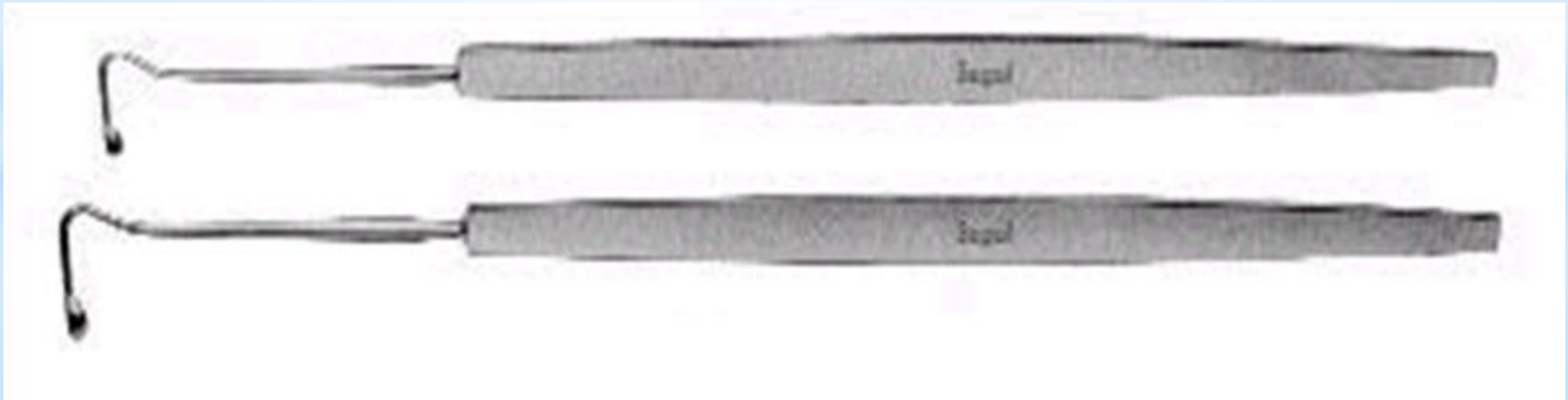
Calipre



Strabismus Muscle Hook



Strabismus Muscle Hook



Shepard IOL Inserter



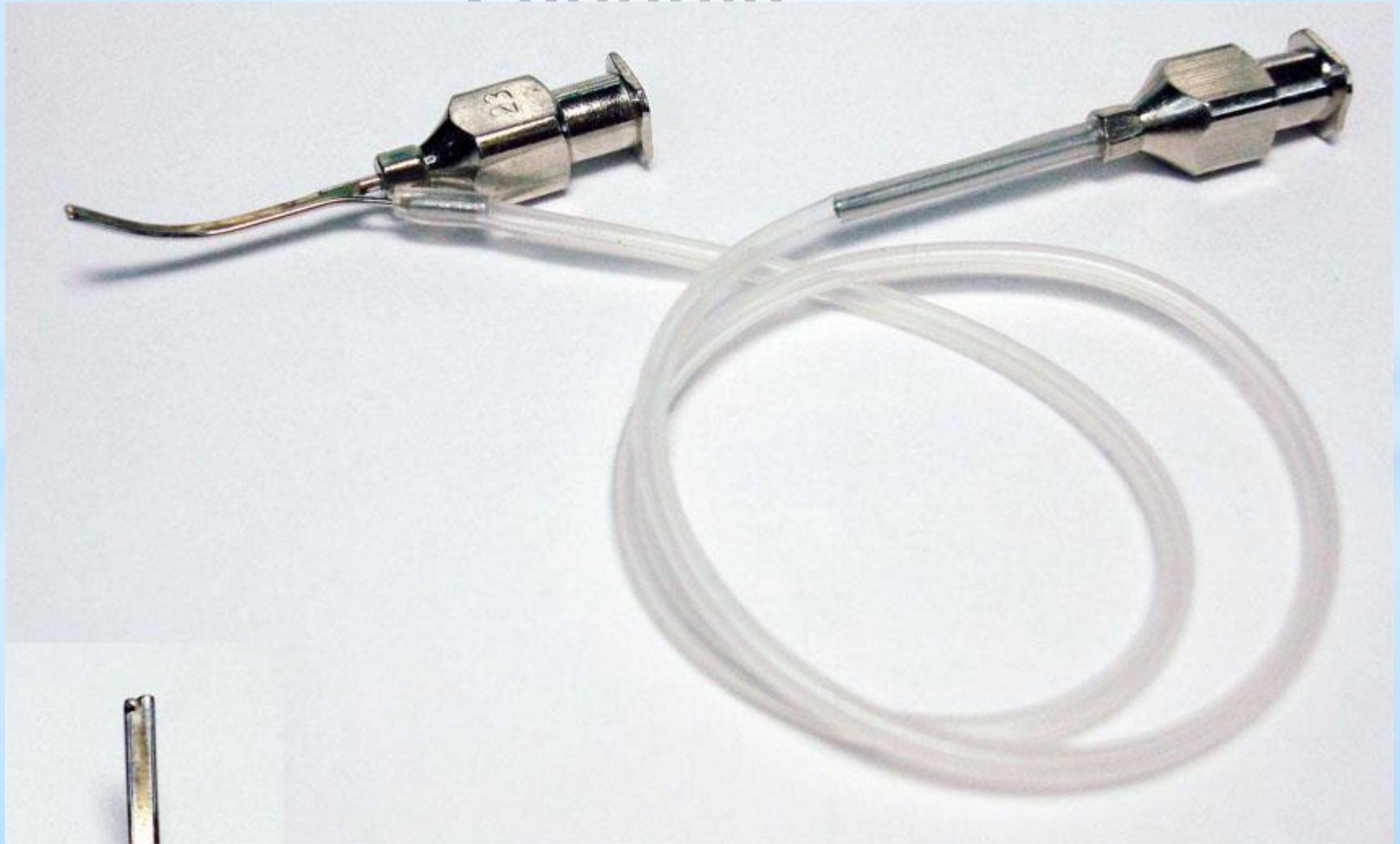
Clayman IOL Forceps



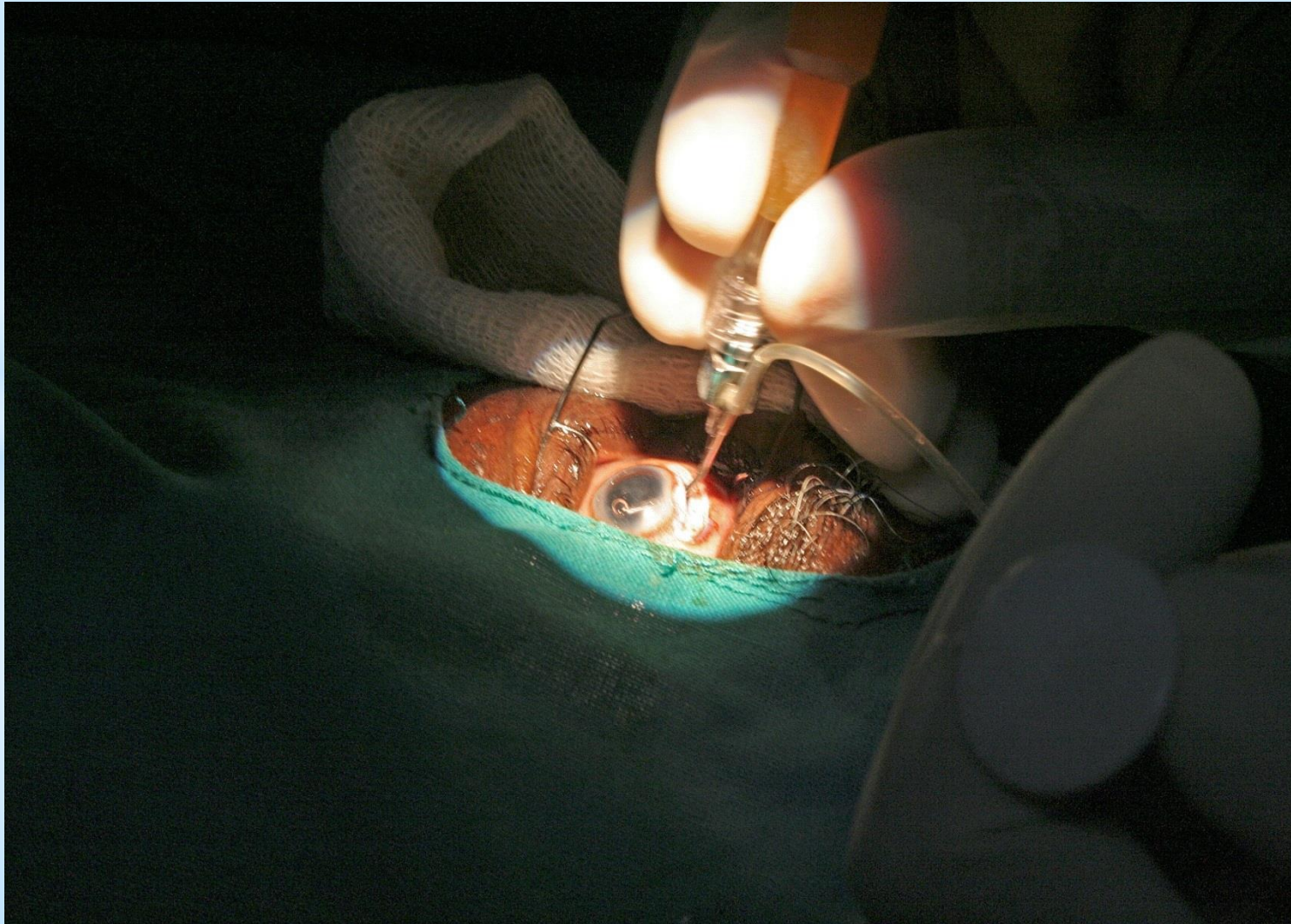
Sinskey IOL Dialer



Simcoe Irrigation/Aspiration Cannula



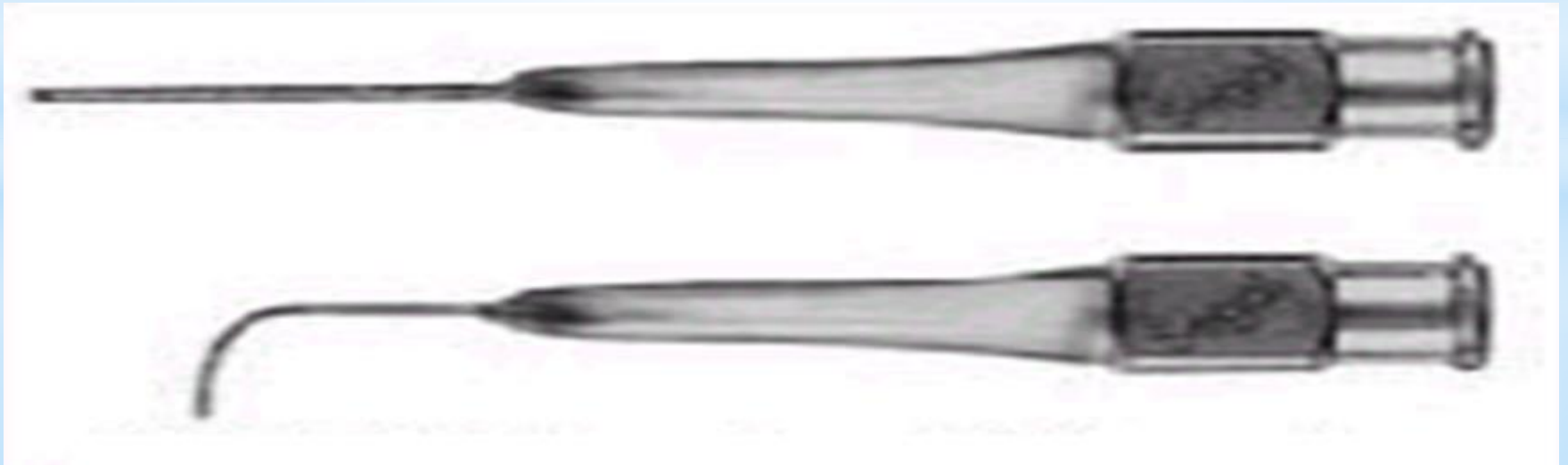
Simcoe Irrigation/Aspiration Cannula



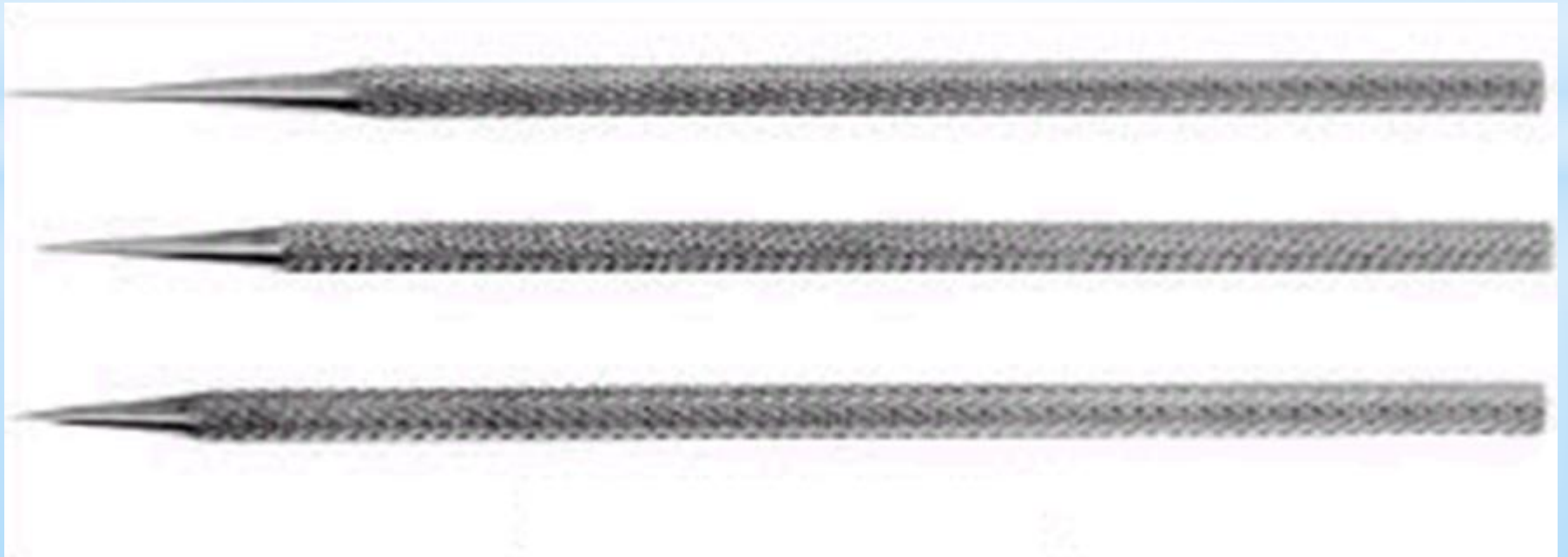
Iris repositor



Lacrimal Cannula



Lacrimal Dilators



Lacrimal Probes



SO-266 Bowman

DCR Punch



Blade Holder



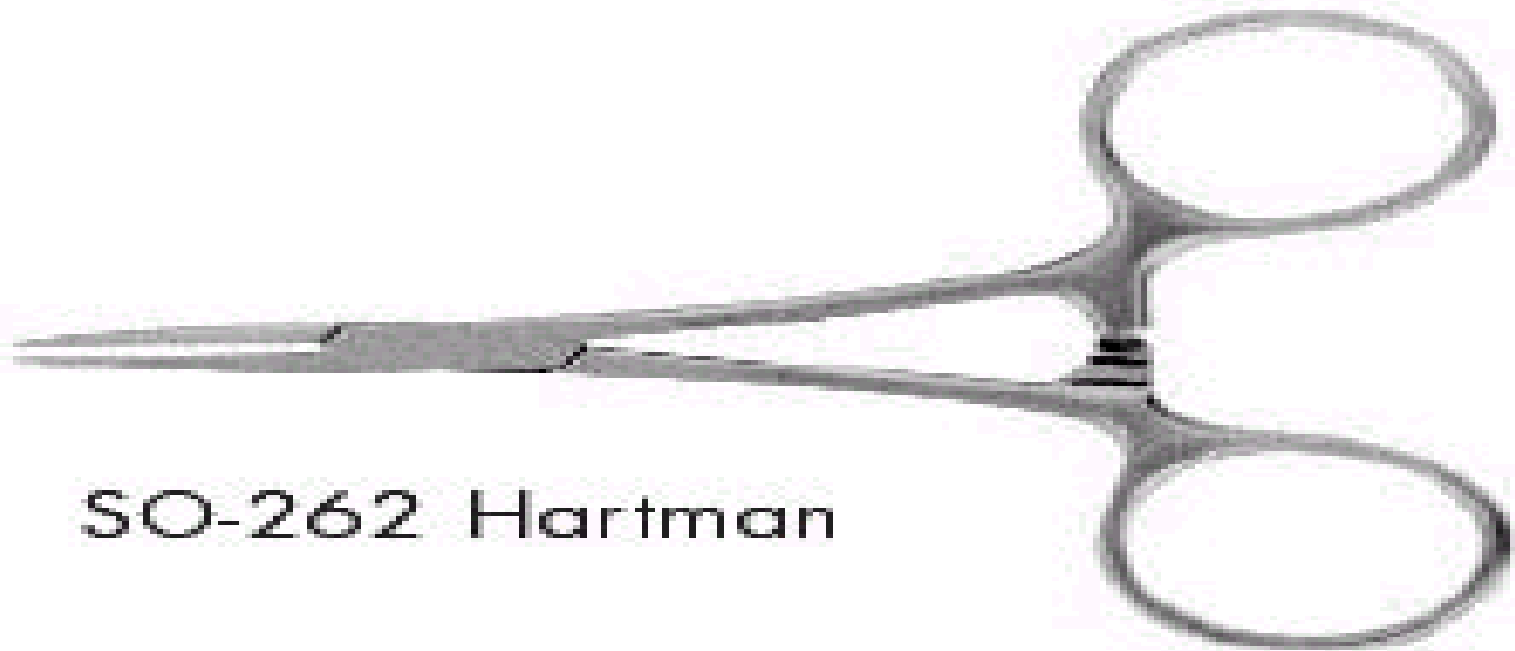
SO-199 Bard Parker Handle

Blade Holder



SO-80 Chuck Handle

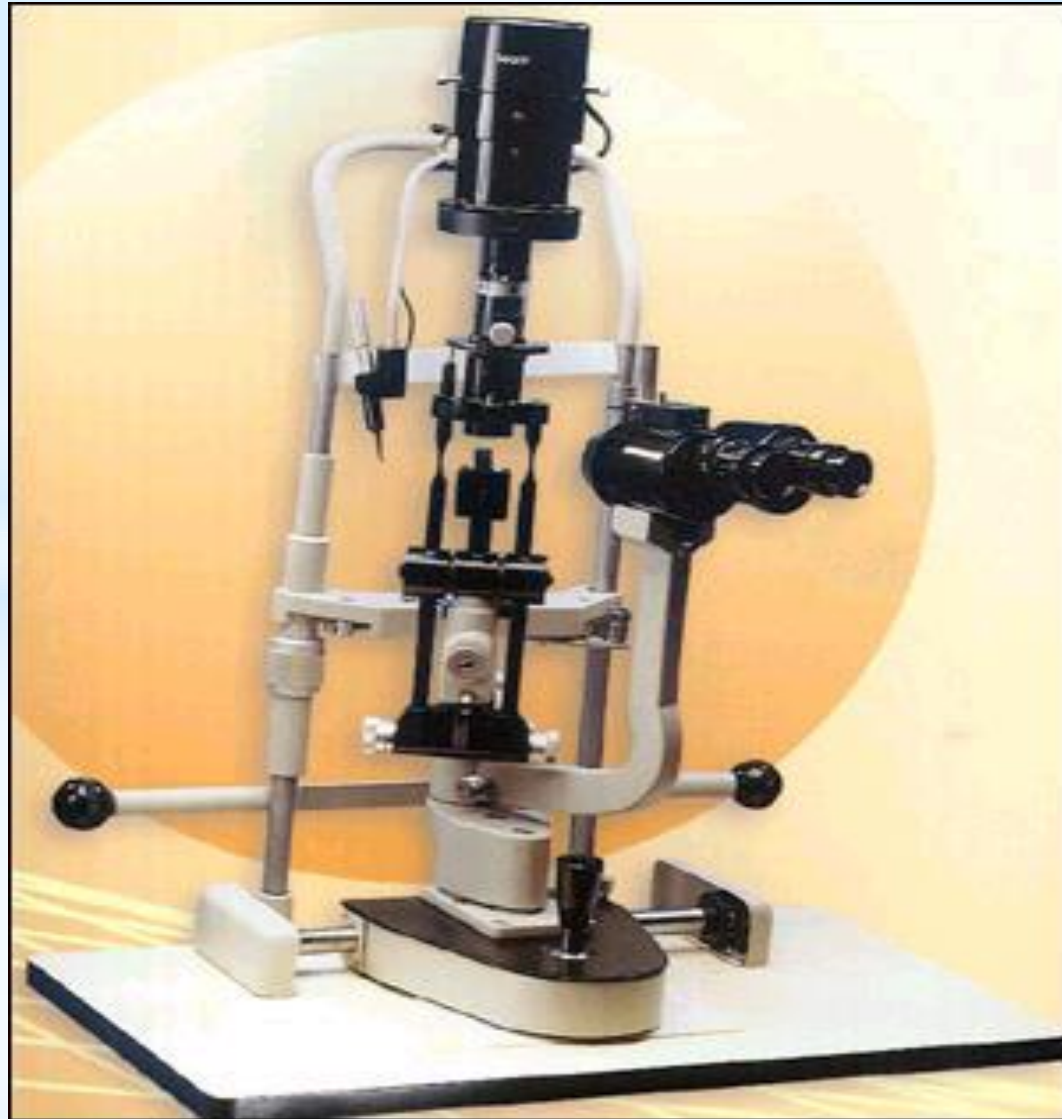
Artery Forceps



SO-262 Hartman

Clinic Instruments

Slitlamp



Lens Trial Case



Trial Frame



Lenzometer

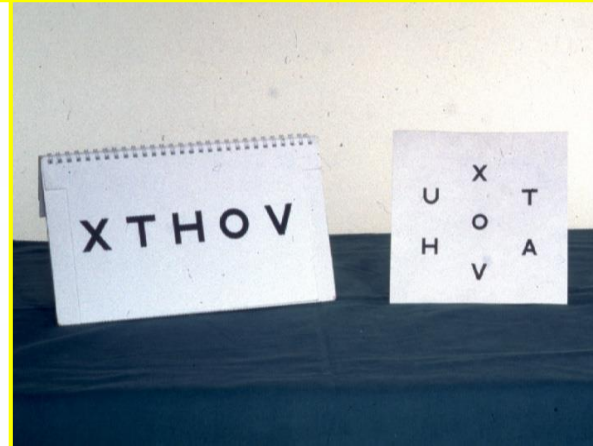


Visual acuity tests in verbal children

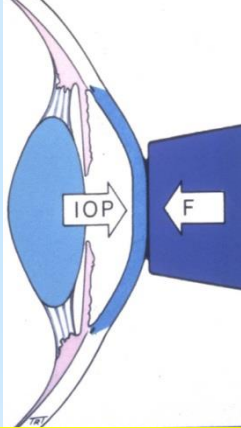
At age 2 years (naming pictures)



At age 3 years (matching tests)



Tonometers



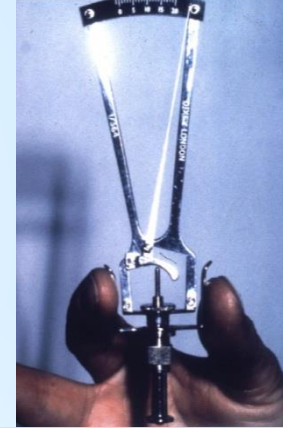
Goldmann

Contact applanation



Perkins

Portable contact applanation



Schiotz

Contact indentation



Air-puff

Non-contact indentation



Pulsair 2000 (Keeler)

Portable non-contact applanation



Tono-Pen

Portable contact applanation

Indirect Ophthalmoscopy

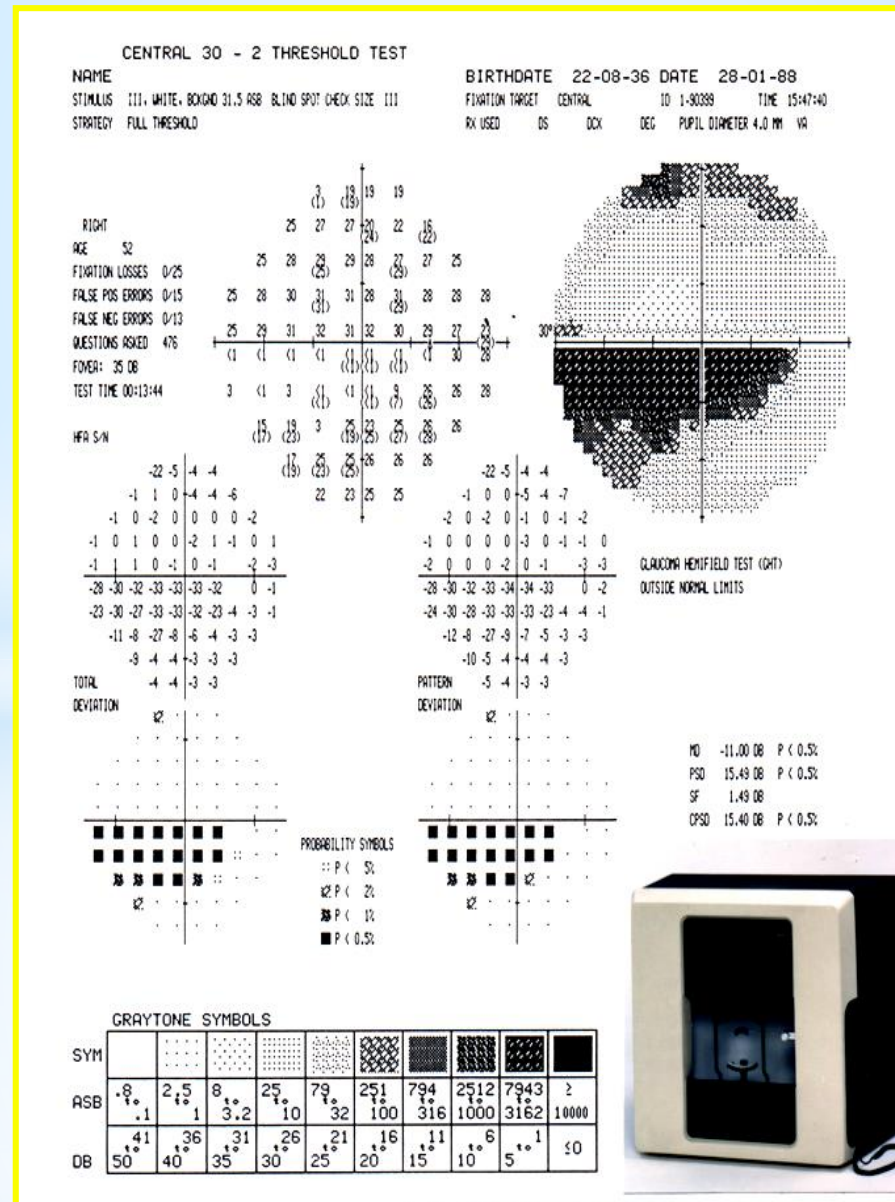


Fundus Photography & Flourescein Angiography



- 1. Take red-free photograph**
- 2. Inject rapidly 5 ml of 10% solution**
- 3. Take photographs at 1 sec intervals between 5-25 sec after injection**

Visual Field Examination



Humphrey
Perimetry

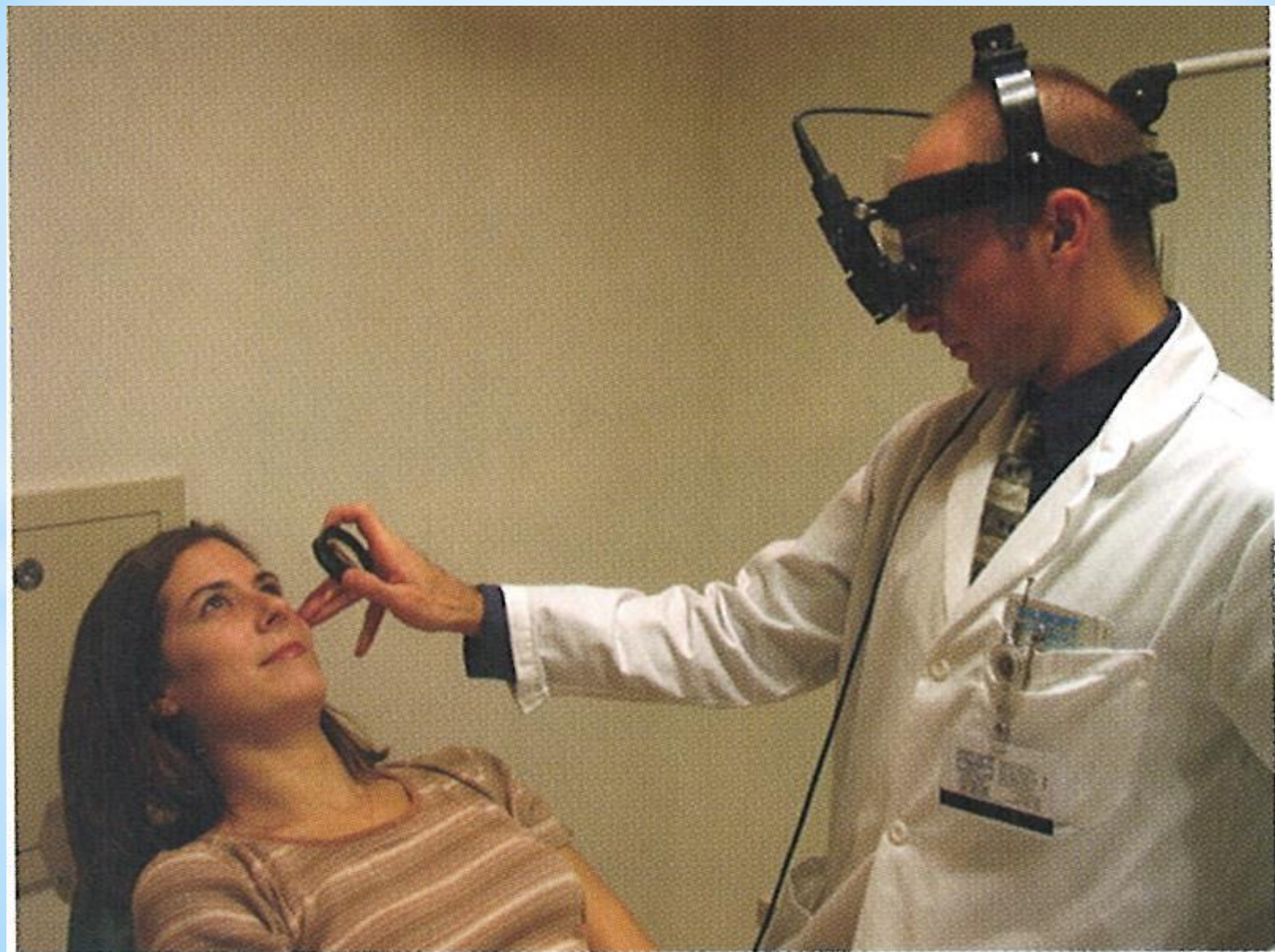


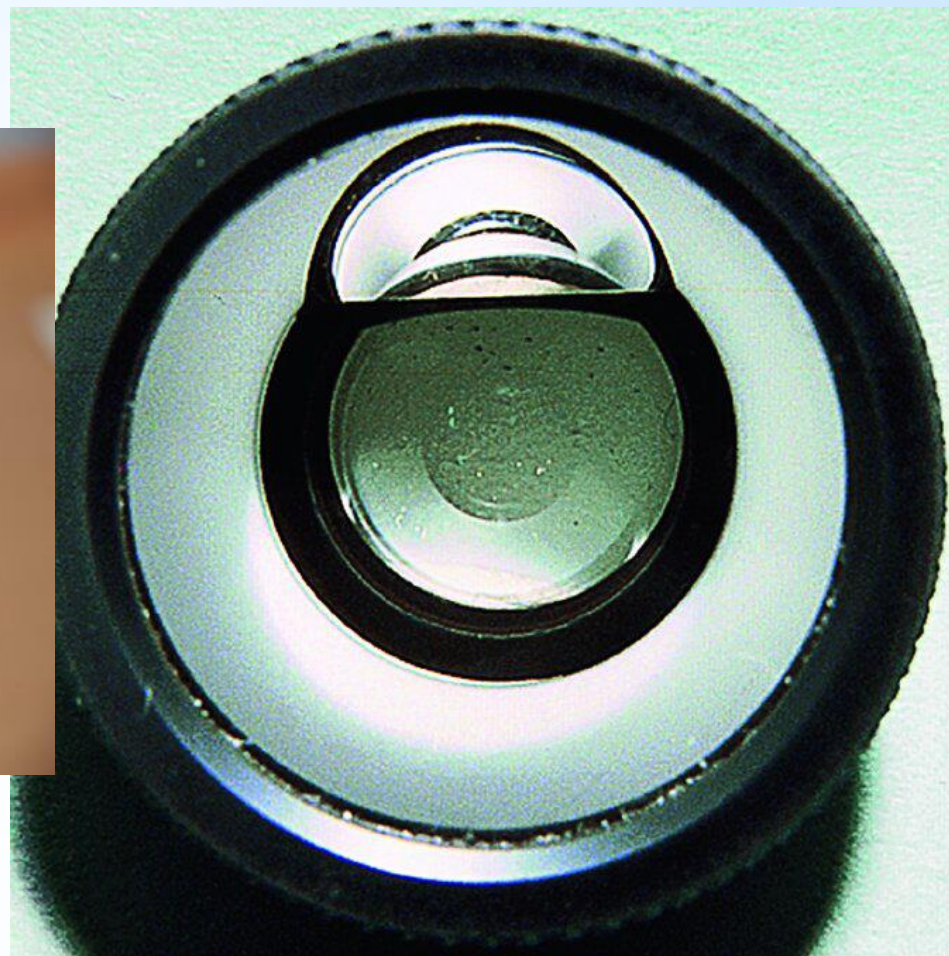
Keratometer



Surgical Loop







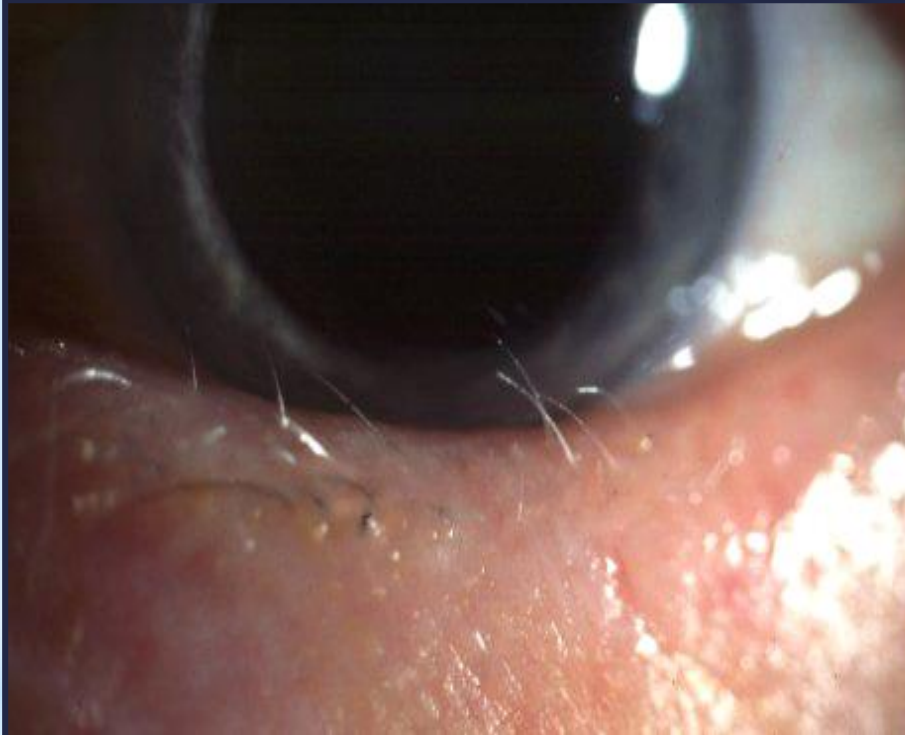
EYELIDS

DISORDERS OF LASHES

- 1. Trichiasis**
- 2. Distichiasis**
- 3. Madarosis**
- 4. Poliosis**

Trichiasis

Signs



- Posterior misdirection of normal lashes
- Most frequently affects lower lid

Complications



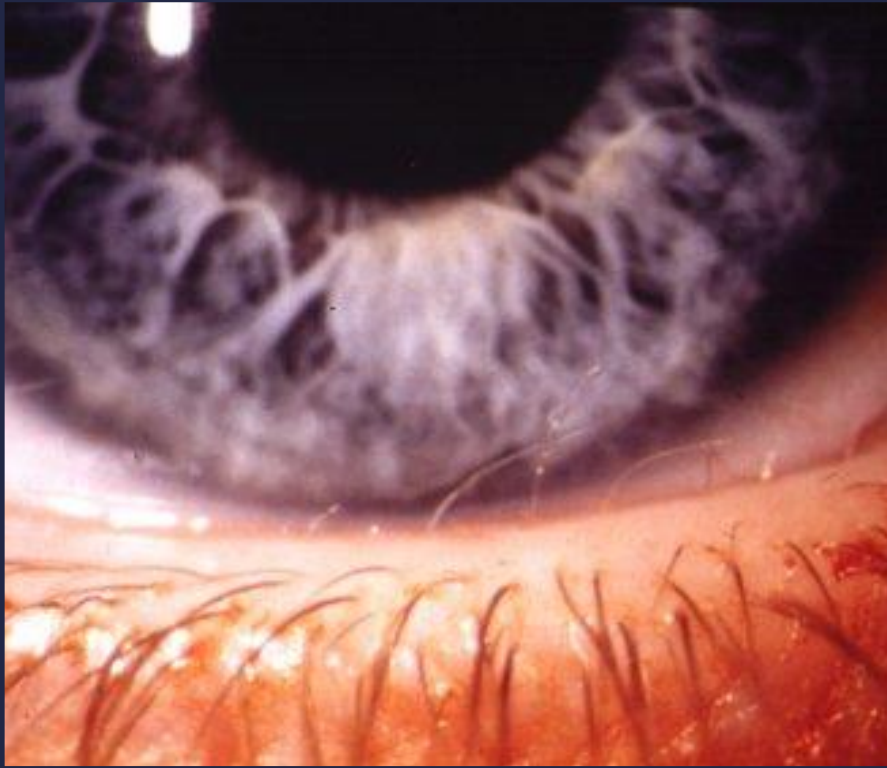
- Inferior punctate epitheliopathy
- Corneal ulceration and pannus

Treatment Options for Trichiasis

1. **Epilation** - but recurrences within few weeks
2. **Electrolysis** - but frequently repeated treatments required
3. **Cryotherapy** - for many lashes
4. **Laser ablation** - for few scattered lashes
5. **Surgery** - for localized crop resistant to other methods

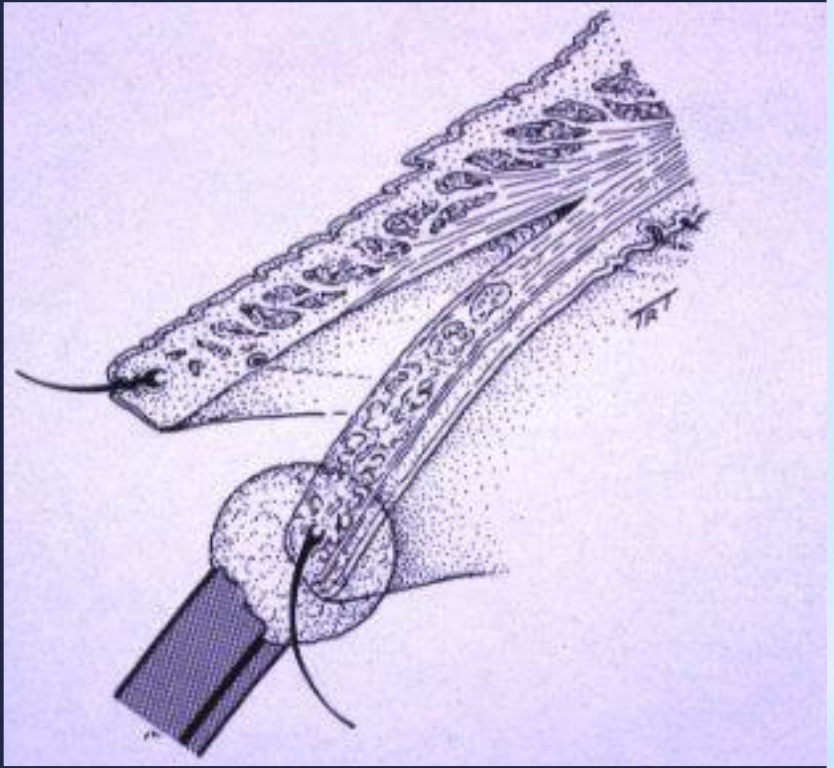
Distichiasis

Signs



- Second row of lashes arising from meibomian gland orifices
- Congenital
- Occasionally dominantly inherited

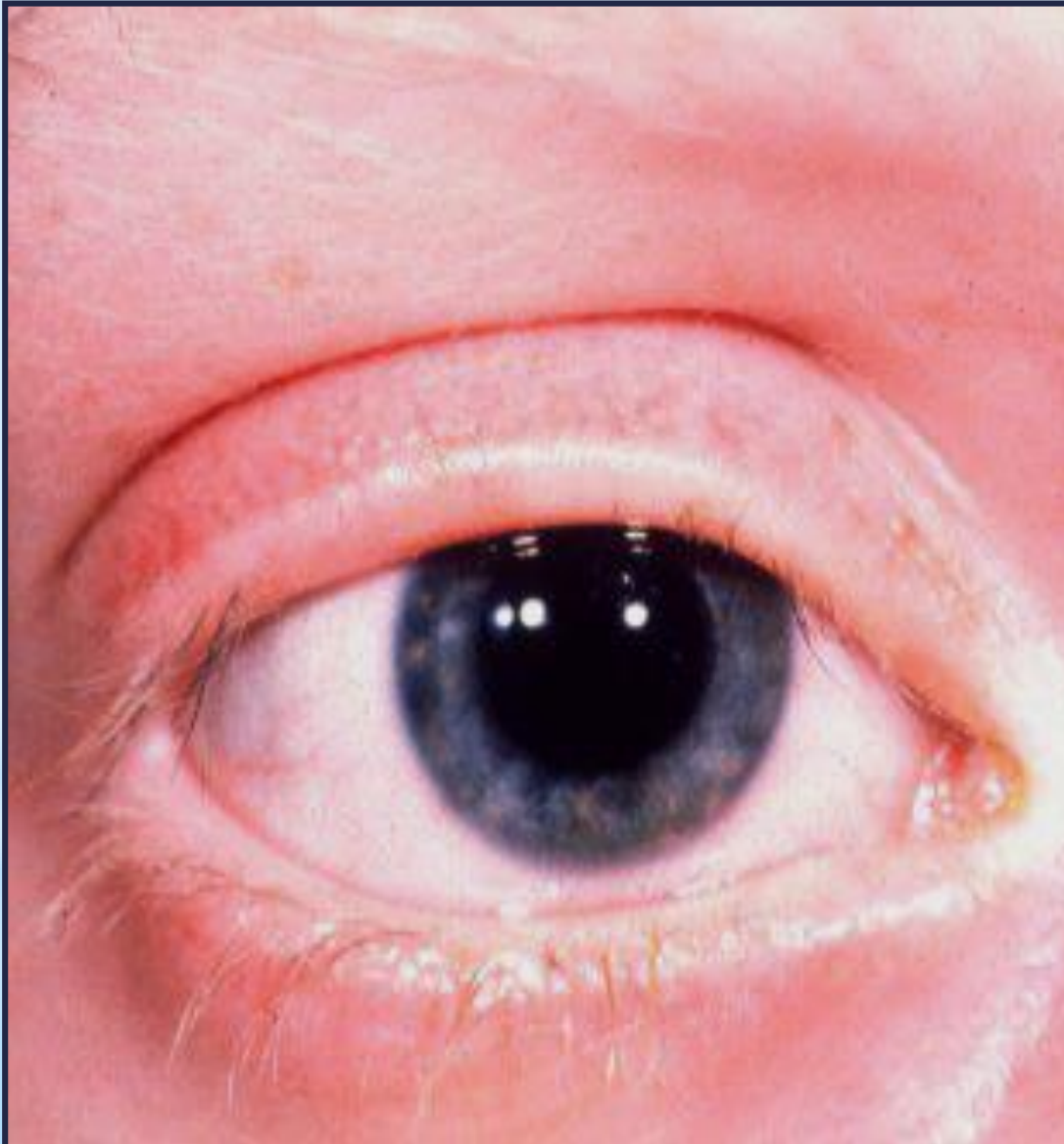
Treatment



- Division into anterior and posterior lamellae
- Cryotherapy to posterior lamella
- Reapposition of lamellae

Madarosis

Decrease in number or complete loss of lashes



Local causes

- Chronic anterior lid margin disease
- Infiltrating tumours
- Burns, radiotherapy or cryotherapy

Systemic causes

- Generalized alopecia
- Myxoedema
- SLE
- Syphilis
- Leprosy

Following removal

Poliosis

Premature localized whitening of hair



Ocular associations

- Chronic anterior blepharitis
- Sympathetic ophthalmitis

Systemic associations

- Vogt-Koyanagi-Harada syndrome
- Waardenburg syndrome

CHRONIC MARGINAL BLEPHARITIS

1. Anterior

- Staphylococcal
- Seborrhoeic

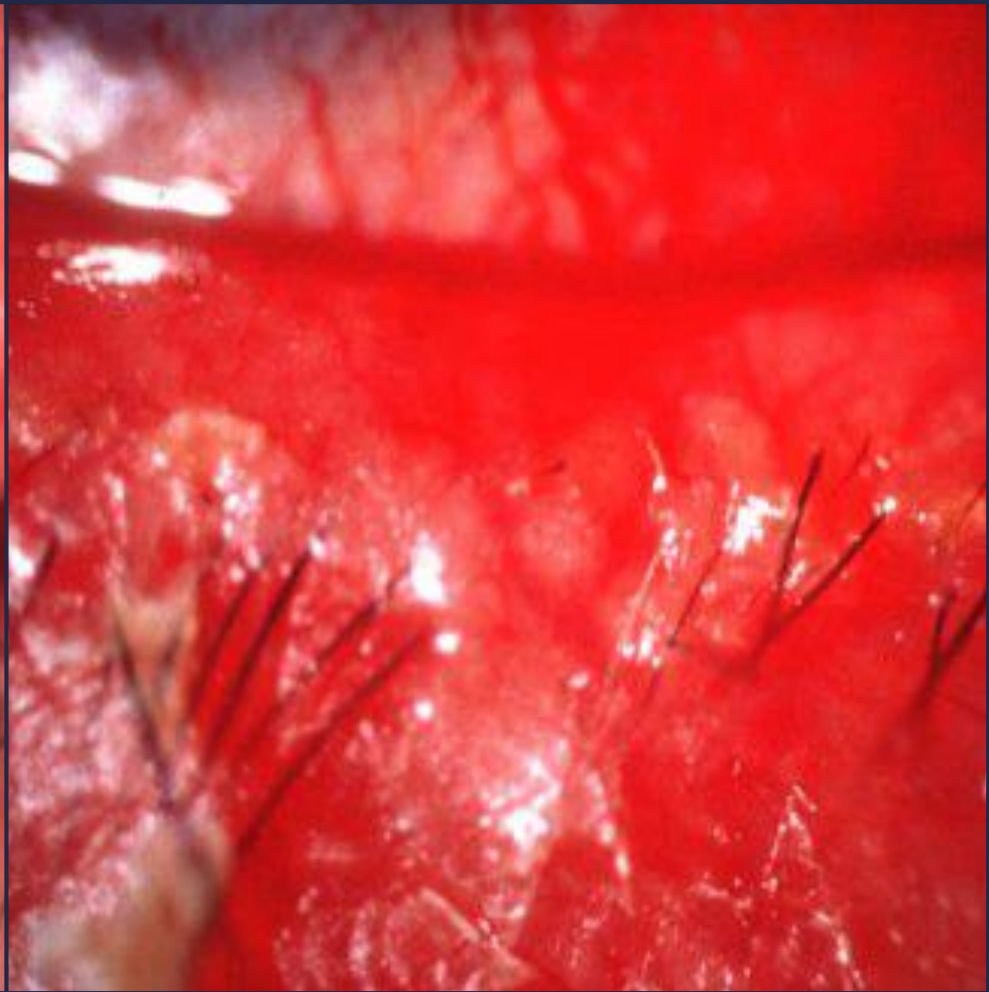
2. Posterior

- Meibomianitis
- Meibomian seborrhoea

Staphylococcal blepharitis

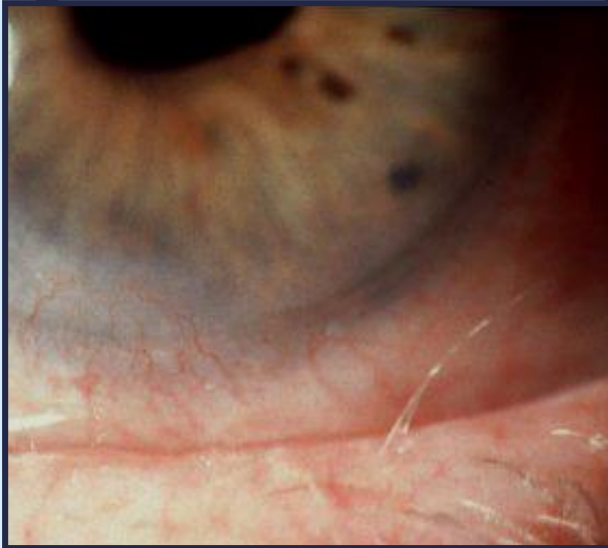


Chronic irritation worse in mornings
Scales around base of lashes
(collarettes)



Hyperaemia and telangiectasia of
anterior lid margin
Scarring and hypertrophy if longstanding

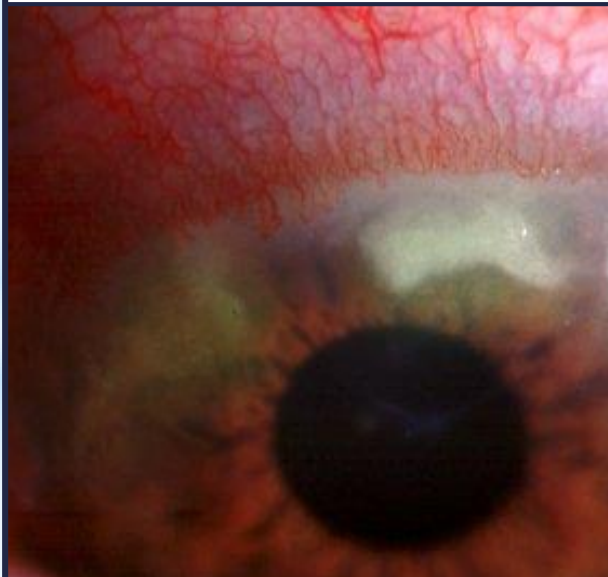
Complications of staphylococcal blepharitis



Madarosi, Poliosis, Trichiasis



Recurrent styes



Marginal keratitis

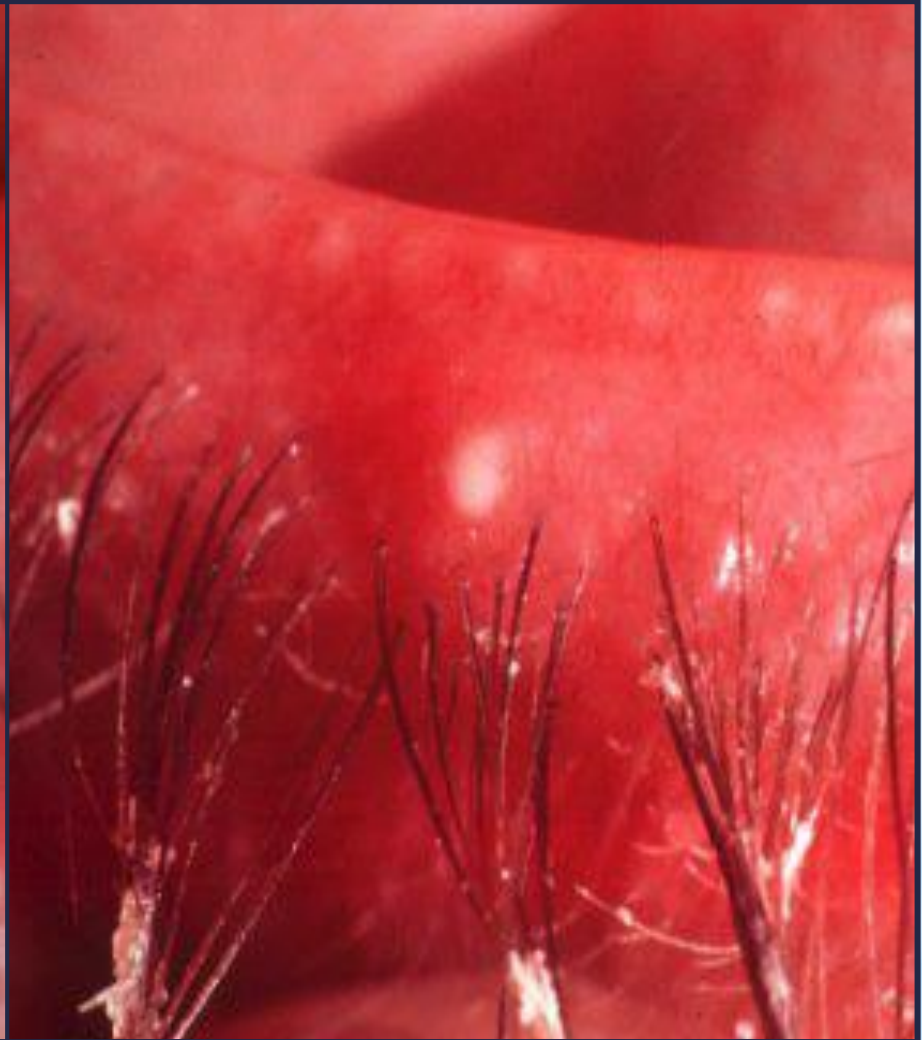


Tear film instability

Seborrhoeic blepharitis

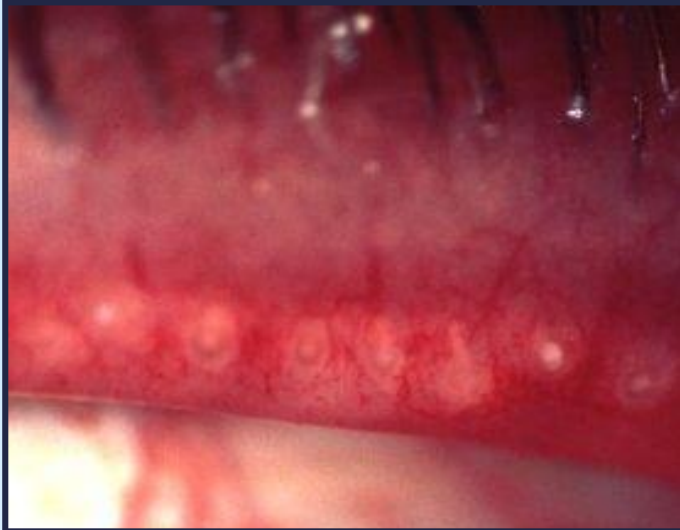


- Shiny anterior lid margin
- Hyperaemia of lid margin

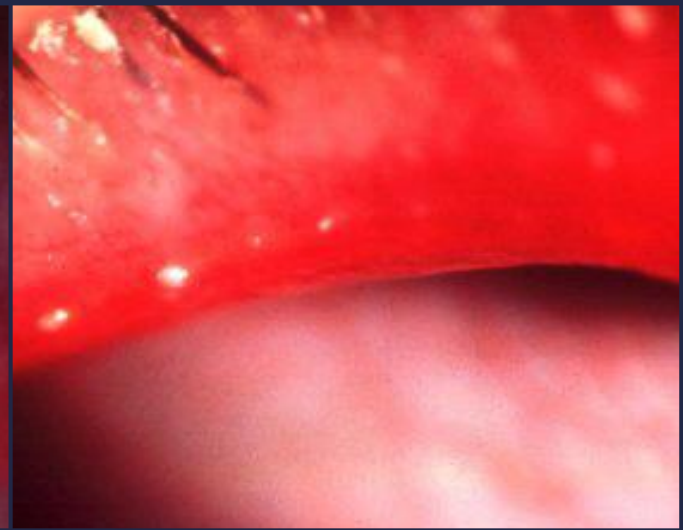


- Greasy scales
- Lashes stuck together

Meibomianitis



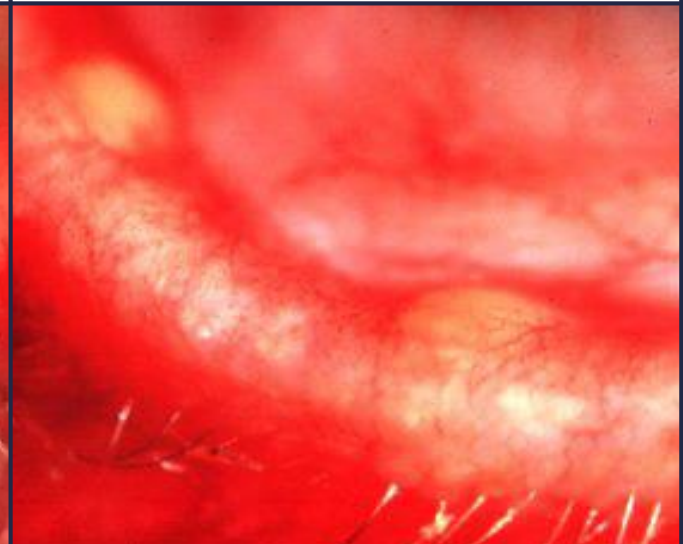
**Inflamed and blocked
meibomian gland orifices**



**Toothpaste-like plaques
from meibomian glands**



Thickened posterior lid margin



Meibomian cyst formation

Treatment of Chronic Blepharitis

1. **Lid hygiene** - with 25% baby shampoo
2. **Tear substitutes** - for associated tear film instability
3. **Systemic tetracyclines** - for severe posterior blepharitis
4. **Warm compresses** - to melt solidified sebum in posterior blepharitis

DIFFUSE EYELID DISEASE

1. Allergic

- Acute oedema
- Contact dermatitis
- Atopic dermatitis
- Blepharochalasis

2. Infections

- Preseptal cellulitis
- Herpes simplex
- Herpes zoster ophthalmicus
- Impetigo
- Erysipelas
- Necrotizing fasciitis

3. Miscellaneous

- Fat herniation
- Systemic causes

Acute allergic oedema



- **Causes - insect bites, urticaria and angioedema**
- **Unilateral or bilateral**
- **Painless, red, pitting oedema**
- **Chemosis may be present**
- **Self-limiting**

Contact dermatitis

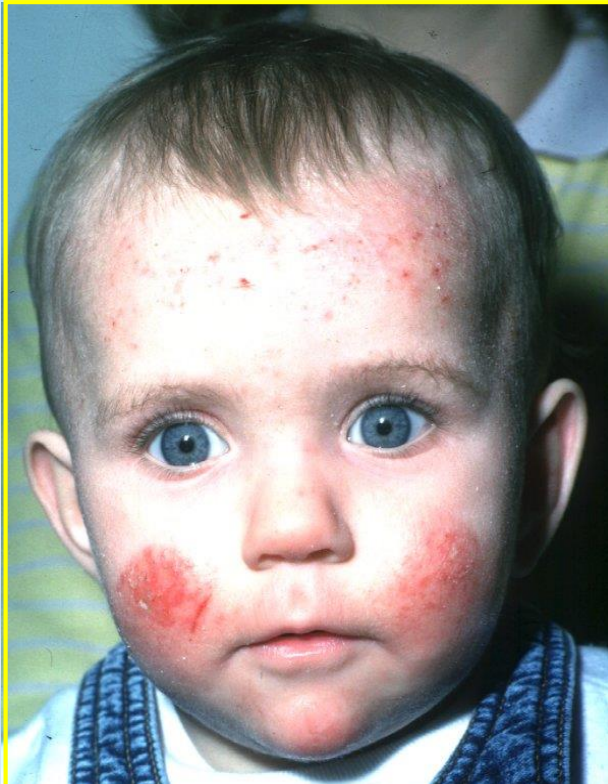


- Sensitivity to topical medication
- Unilateral or bilateral
- Painless oedema and erythema
- Vesiculation and crusting
- Thickening if chronic

Atopic dermatitis

Associated with asthma and hay fever

- **Chronic itching and scratching**



Facial - in young children



Flexural - knees, elbows, wrists and ankles

Ocular associations of atopic dermatitis



Thickening, crusting and fissuring



Staph. blepharitis



Angular blepharitis

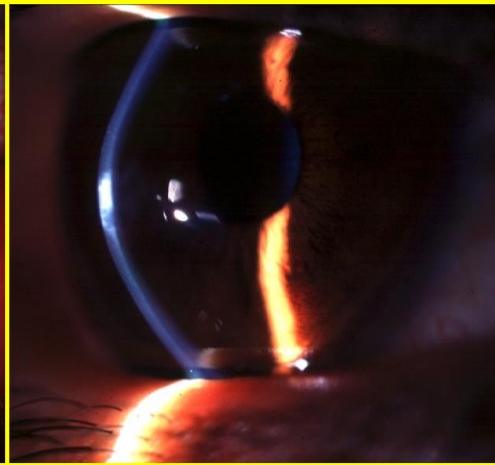


Vernal disease in children

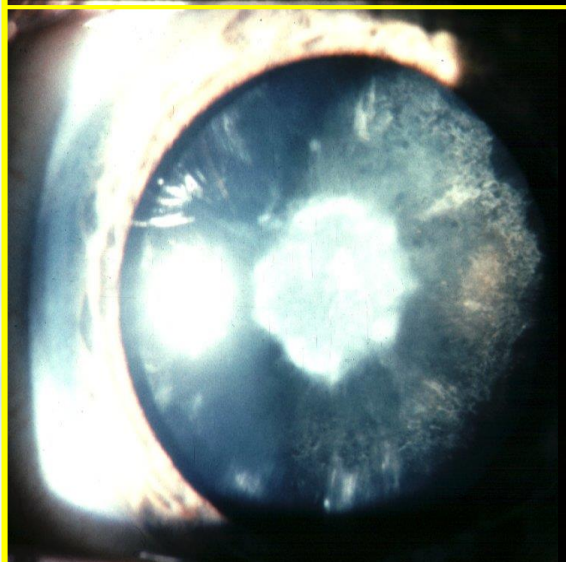
Ocular associations of atopic dermatitis



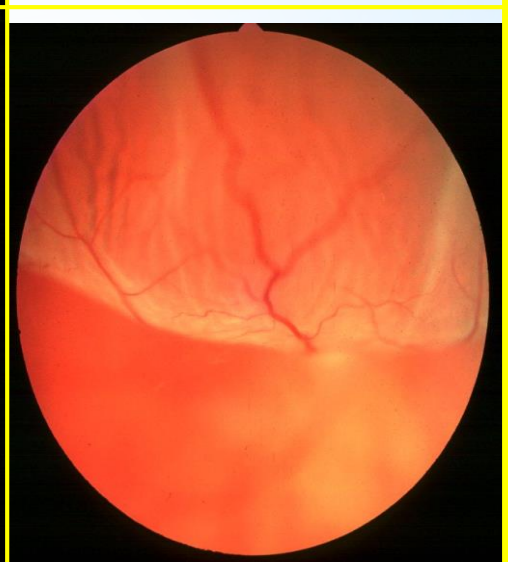
Keratoconjunctivitis



Keratoconus



Shield - like cataract



Retinal detachment

Preseptal cellulitis



Causes

- Skin trauma or insect bites of lids or eyebrows
- Spread from local infection
- Upper respiratory or ear infection

Signs

- Usually unilateral
- Tender and red
- Periorbital oedema

Treatment –
systemic antibiotics

Herpes simplex



Signs

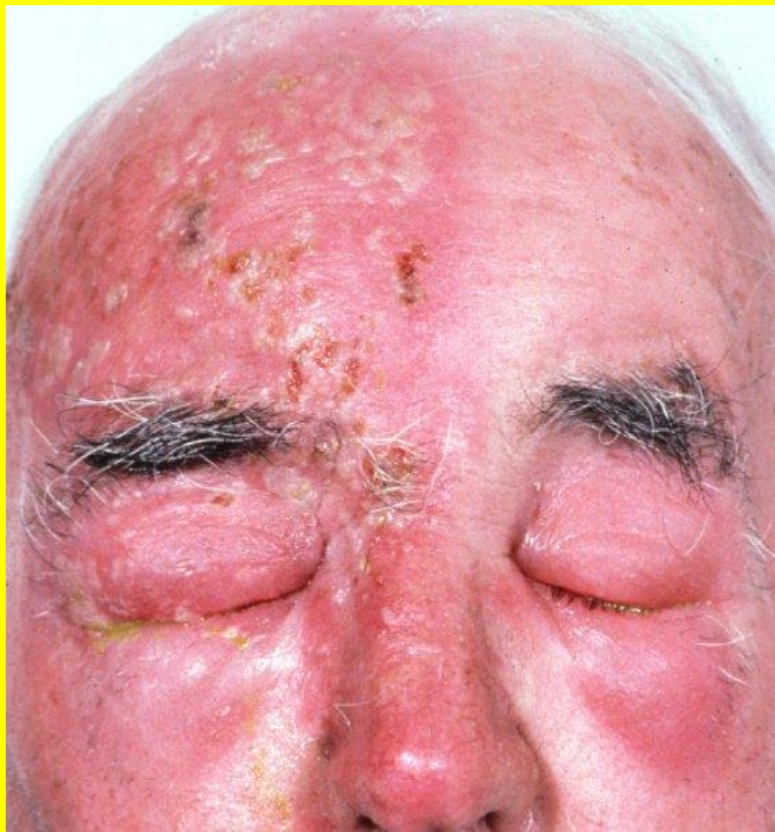
- Crops of small vesicles
- Rupture and crust
- Heal without scarring after 7 days

Complications

- Follicular conjunctivitis
- Keratitis

Treatment –
Topical antivirals

Herpes zoster ophthalmicus



- Painful vesicles and pustules
- Periorbital oedema - may be bilateral



- Crusting ulceration
- Treatment** - oral antivirals

Systemic causes of lid oedema



- **Myxoedema**
- **Renal disease**
- **Congestive heart failure**
- **Obstruction of superior vena cava**
- **Fabry disease**

BENIGN EYELID LESIONS

1. Nodules

- Chalazion
- Acute hordeola
- Molluscum contagiosum
- Xanthelasma

2. Cysts

- Cyst of Moll
- Cyst of Zeiss
- Sebaceous cyst
- Hidrocystoma

3. Tumours

- Viral wart
- Keratoacanthoma
- Naevi
 - Capillary haemangioma
- Port-wine stain
- Pyogenic granuloma
- Cutaneous horn

Signs of Chalazion (Meibomian cyst)

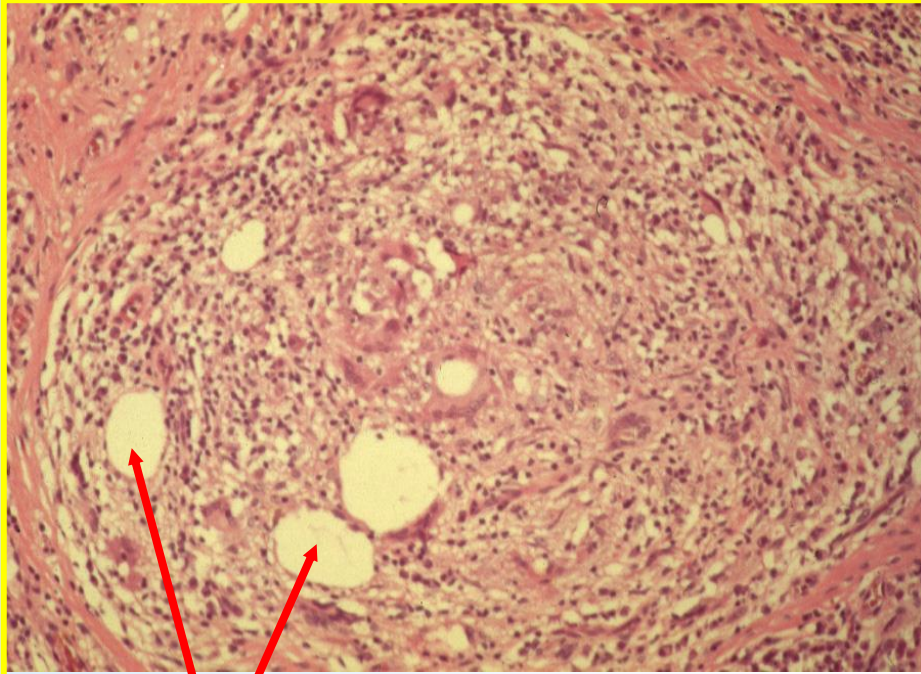


**Painless, roundish, firm lesion
within tarsal plate**

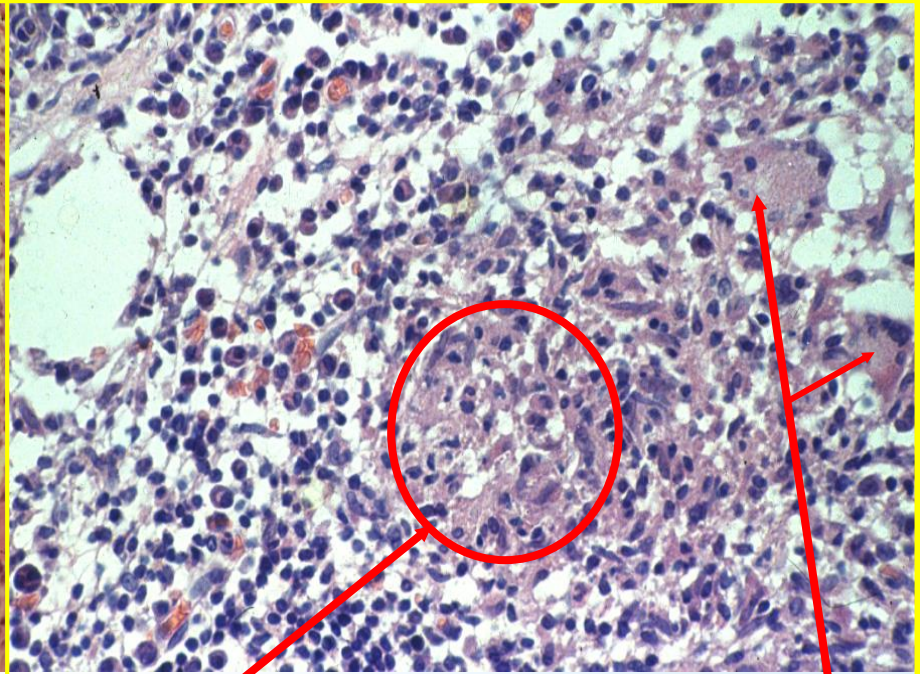


**May rupture through conjunctiva
and cause granuloma**

Histology of chalazion



Multiple, round spaces previously containing fat with surrounding granulomatous inflammation



Epithelioid cells

Multinucleated giant cells

Xanthelasma



- **Common in elderly or those with hypercholesterolaemia**
- **Yellowish, subcutaneous plaques containing cholesterol and lipid**
- **Usually bilateral and located medially**

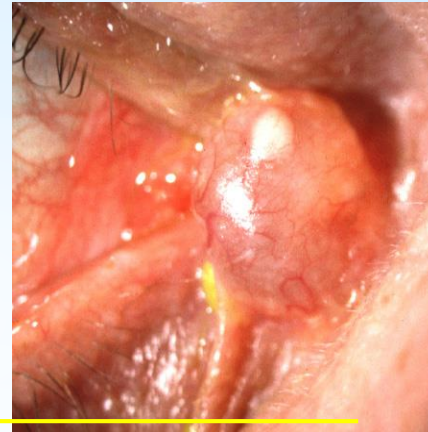
Eyelid cysts

Cyst of Moll



- Translucent
- On anterior lid margin

Eccrine sweat gland hidrocystoma



- Similar to cyst of Moll
- Not confined to lid margin

Cyst of Zeis



- Opaque
- On anterior lid margin

Sebaceous cyst



- Cheesy contents
- Frequently at inner canthus

Naevi

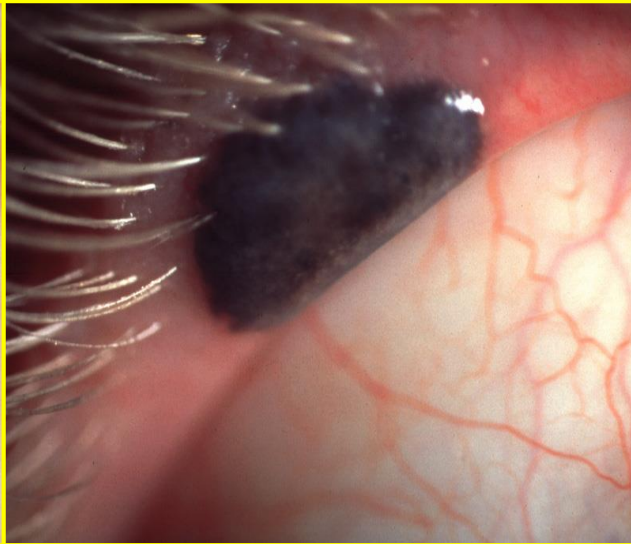
- Appearance and classification determined by location within skin
- Tend to become more pigmented at puberty

Intradermal



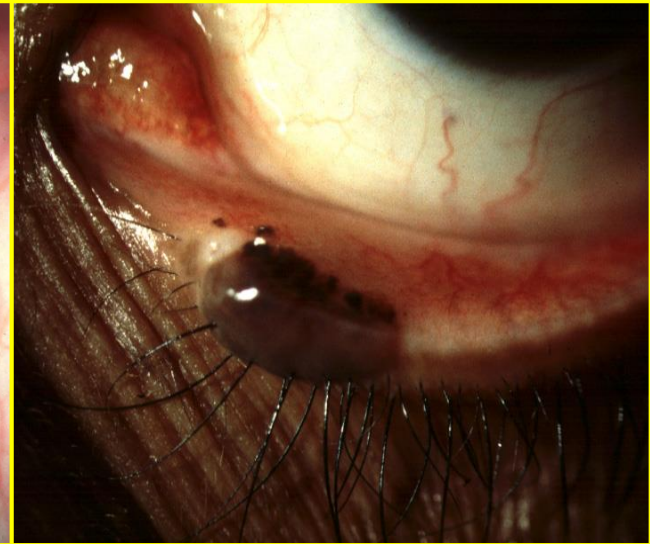
- Elevated
- May be non-pigmented
- No malignant potential

Junctional



- Flat, well-circumscribed
- Pigmented
- Low malignant potential

Compound



- Has both intradermal and junctional components

MALIGNANT EYELID TUMOURS

- 1. Basal cell carcinoma**
- 2. Squamous cell carcinoma**
- 3. Meibomian gland carcinoma**
- 4. Melanoma**
- 5. Kaposi sarcoma**

Frequency of location of basal cell carcinoma



Lower lid - 70%



Medial canthus - 15%



Upper lid - 10%



Lateral canthus - 5%

Squamous cell carcinoma

- Less common but more aggressive than BCC
- May arise *de novo* or from actinic keratosis
- Predilection for lower lid

Nodular



- Hard, hyperkeratotic nodule
- No surface vascularization
- May develop crusting fissures

Ulcerative



- Red base
- Borders sharply defined, indurated and elevated

Meibomian gland carcinoma

- Very rare aggressive tumour with 10% mortality
- Predilection for upper lid

Nodular

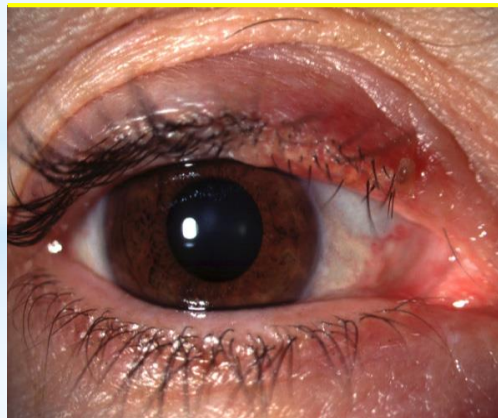


**Hard nodule; may
mimic a chalazion**



Very large tumour

Spreading



**Diffuse thickening of lid
margin and loss of lashes**



**Conjunctival invasion; may
mimic chronic conjunctivitis**

Melanoma

Nodular



- Blue-black nodule with normal surrounding skin
- May be non-pigmented

Superficial spreading



- Plaque with irregular outline
- Variable pigmentation

From lentigo maligna (Hutchinson freckle)



- Affects elderly
- Slowly expanding pigmented macule

Kaposi sarcoma

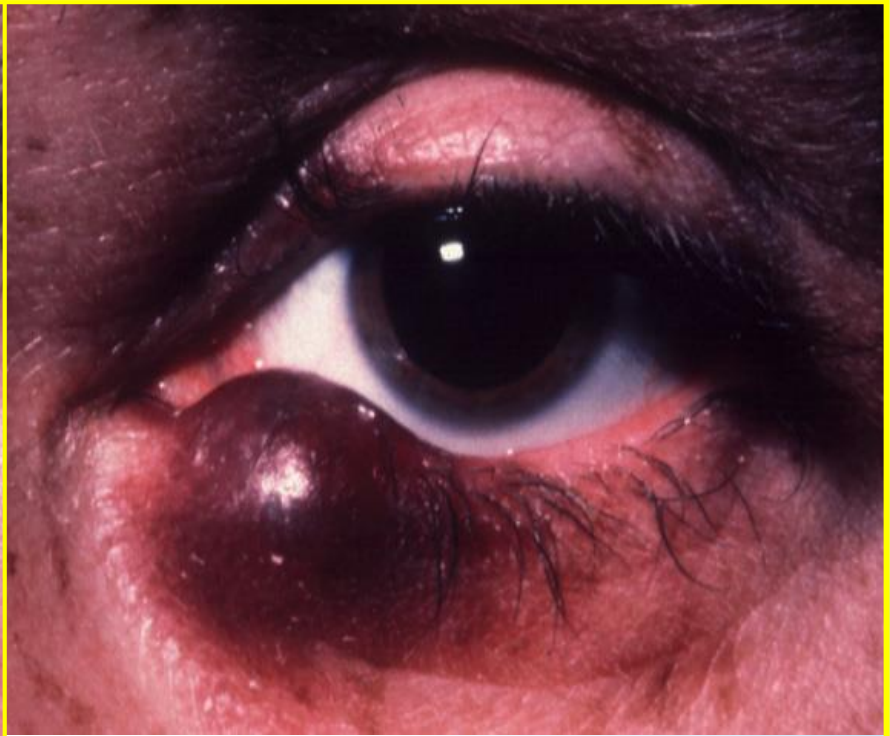
- Vascular tumour occurring in patients with AIDS
- Usually associated with advanced disease
- Very sensitive to radiotherapy

Early



Pink, red-violet lesion

Advanced



May ulcerate and bleed

ECTROPION AND ENTROPION

1. Ectropion

- Involutional
- Cicatricial
- Paralytic
- Mechanical

2. Entropion

- Involutional
- Cicatricial
- Congenital
- Epiblepharon

Involuntary Ectropion



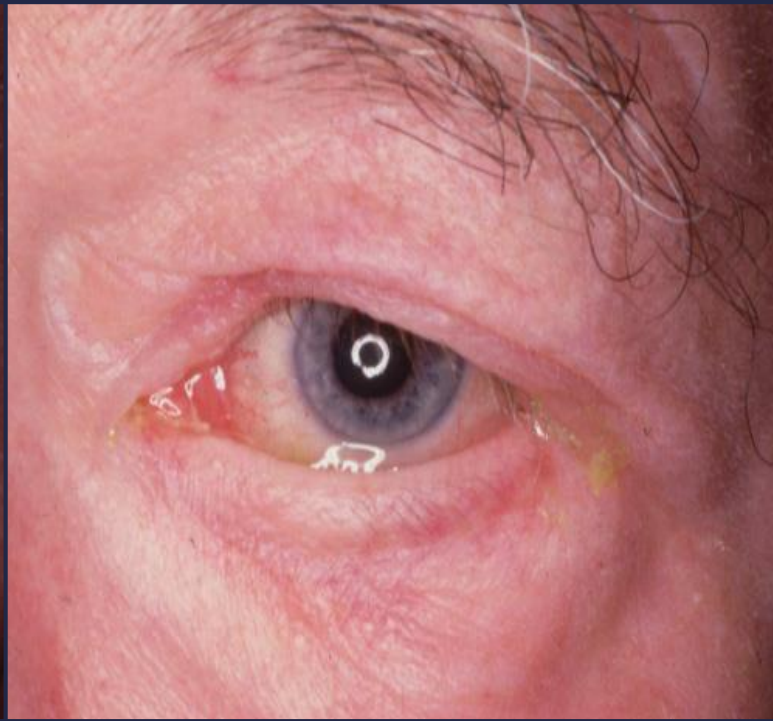
- **Affects lower lid of elderly patients**
- **May cause chronic conjunctival inflammation and thickening**

Paralytic Ectropion

Caused by facial nerve palsy which, if severe, may give rise to the following:



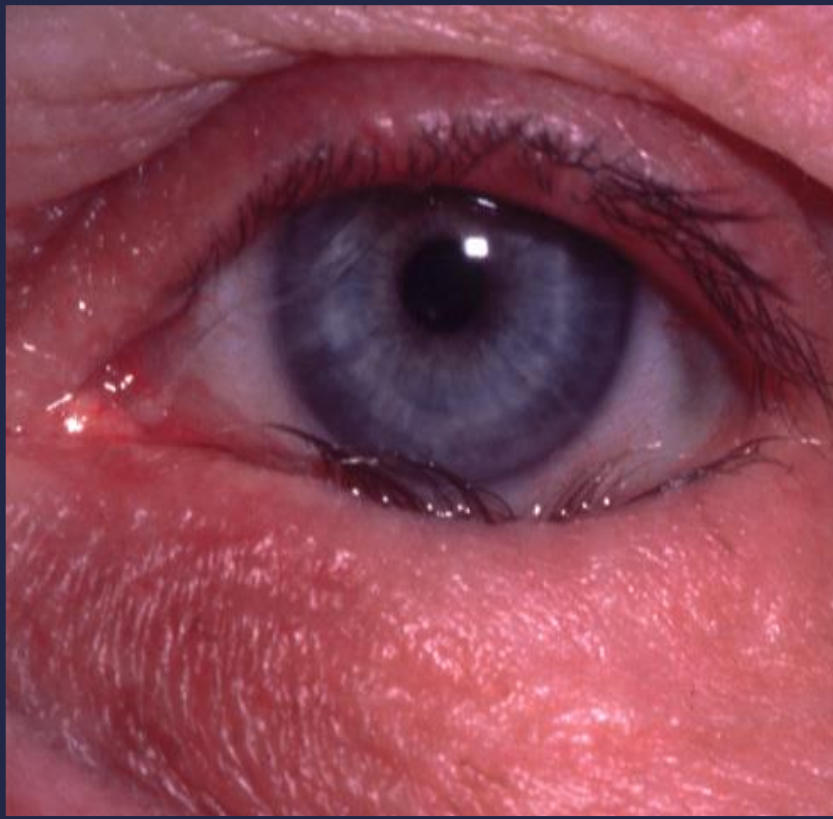
Exposure keratopathy caused by lagophthalmos



Epiphora caused by combination of:

- **Failure of lacrimal pump mechanism**
- **Increase in tear production resulting from corneal exposure**

Involucional Entropion

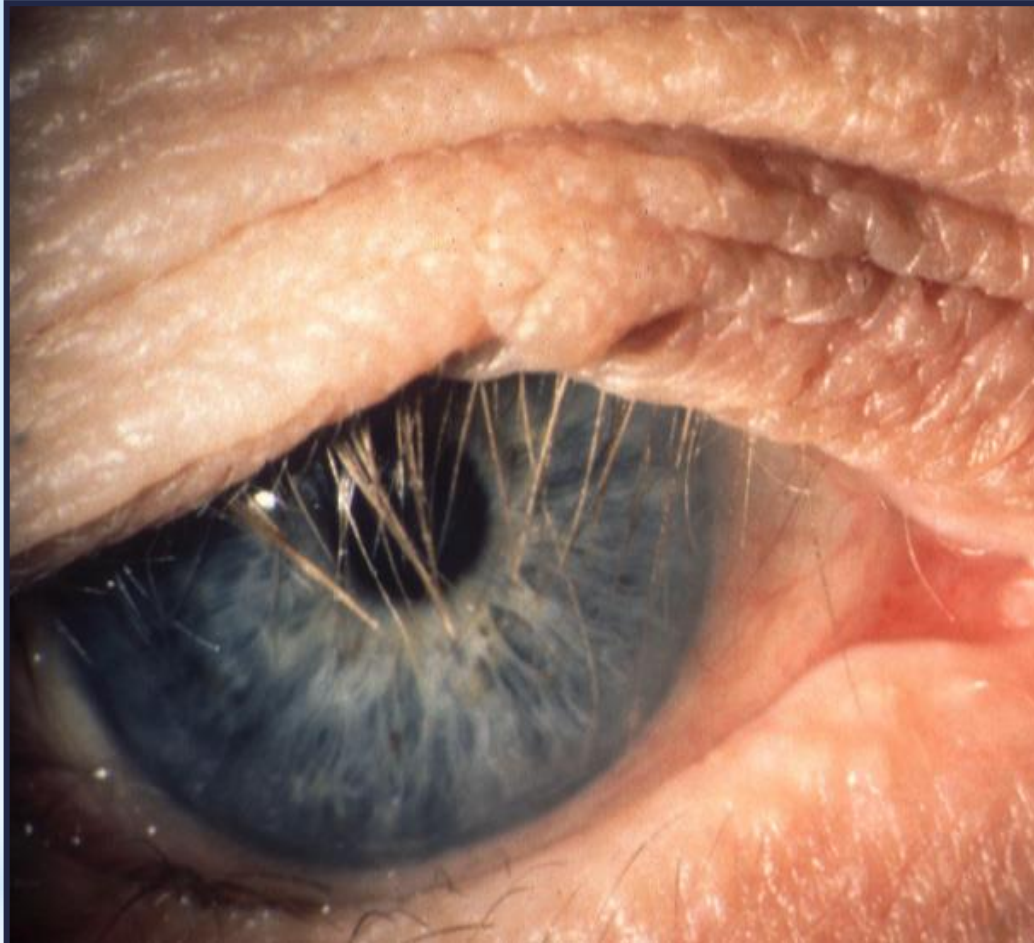


Affects lower lid because upper lid has wider tarsus and is more stable



If longstanding may result in corneal ulceration

Cicatricial Entropion



- **Severe scarring of palpebral conjunctiva which pulls lid margin towards globe**
- **May affect lower or upper eyelid**
- **Causes include cicatrizing conjunctivitis, trachoma and chemical burns**

Congenital Entropion



- **Very rare - not to be confused with epiblepharon**
- **Inturning of entire lower eyelid and lashes**
- **Absence of lower lid crease**
- **When skin is pulled down lid also pulls away from globe**
- **Does not resolve spontaneously**

CLASSIFICATION OF PTOSIS

1. Neurogenic

- Third nerve palsy
- Third nerve misdirection
- Horner syndrome
- Marcus Gunn jaw-winking syndrome

2. Myogenic

- Myasthenia gravis
- Myotonic dystrophy
- Ocular myopathies
- Simple congenital
- Blepharophimosis syndrome

3. Aponeurotic

4. Mechanical

Left third nerve palsy



Severe unilateral ptosis and defective adduction



Normal abduction



Defective elevation



Defective depression

Horner syndrome



- **Caused by oculosympathetic palsy**
- **Usually unilateral mild ptosis and miosis**
- **Normal pupillary reactions**
- **Slight elevation of lower lid**
- **Iris hypochromia if congenital or longstanding**
- **Anhydrosis if lesion is below superior cervical ganglion**

Marcus Gunn jaw-winking syndrome

- Accounts for about 5% of all cases of congenital ptosis
- Retraction or 'wink' of ptotic lid in conjunction with stimulation of ipsilateral pterygoid muscles



Opening of mouth



Contralateral movement of jaw

Simple congenital Ptosis

- Developmental dystrophy of levator muscle
- Occasionally associated with weakness of superior rectus



Unilateral or bilateral ptosis of varying severity



In downgaze ptotic eyelid is slightly higher



Frequent absence of upper lid crease



Usually poor levator function

Aponeurotic Ptosis

- Weakness of levator aponeurosis
- Causes - involutional, postoperative and blepharochalasis

Mild



High upper lid crease



Good levator function

Severe



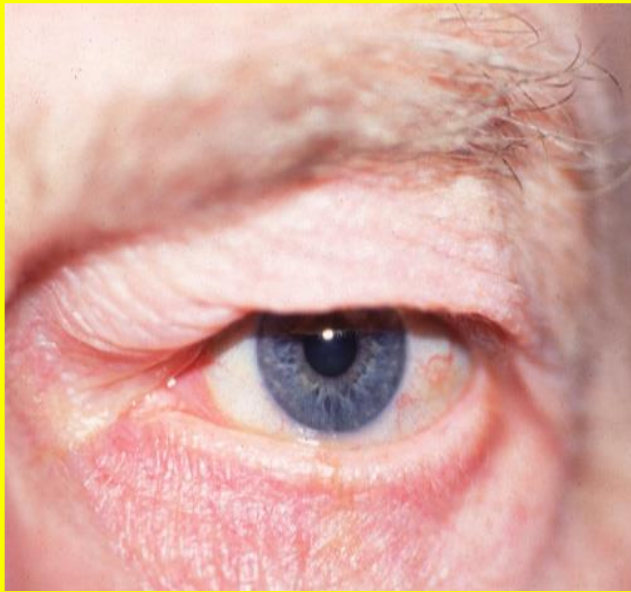
Absent upper lid crease



Deep sulcus

Mechanical Ptosis

Causes



Dermatochalasis



Large tumours



Severe lid oedema



Anterior orbital lesions

Lacrimal System & ORBIT

INFECTIONS OF LACRIMAL PASSAGES

1. Congenital nasolacrimal duct obstruction

2. Dacryocystitis

- Acute
- Chronic

Congenital nasolacrimal duct obstruction

- Caused by delayed canalization near valve of Hasner•
- On pressure reflux of purulent material from punctum•



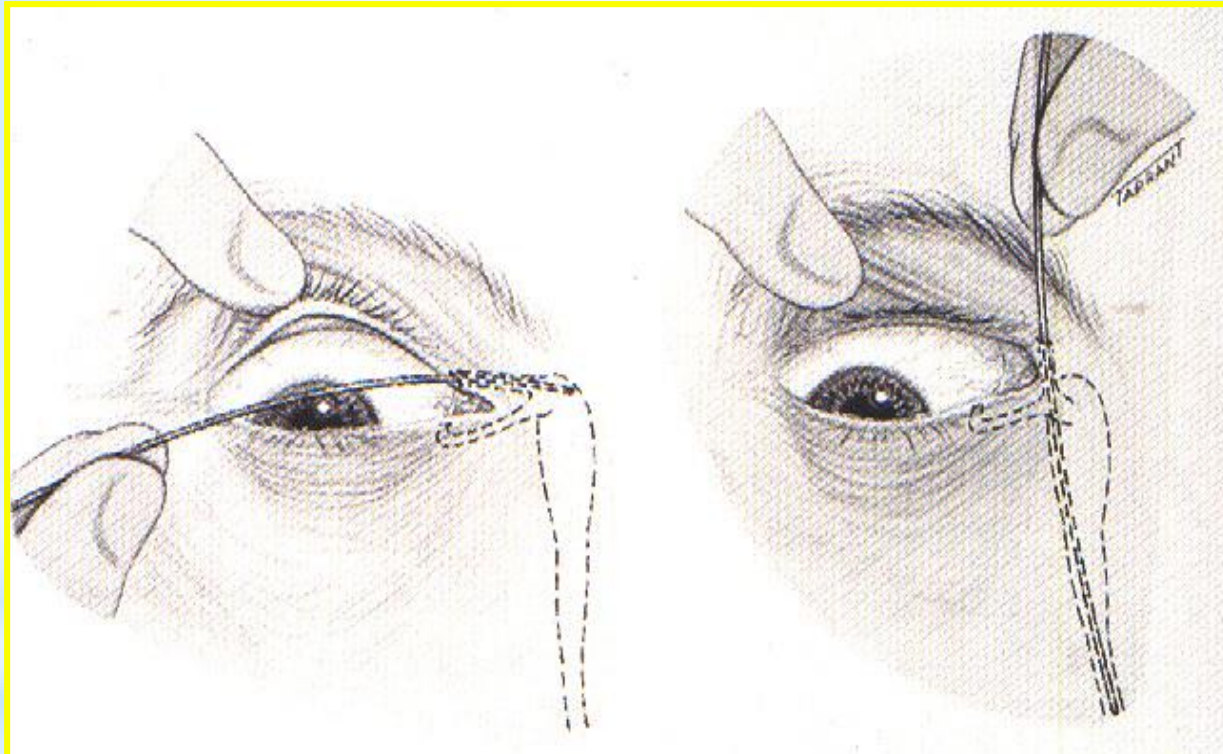
Epiphora and matting



Infrequently acute dacryocystitis

Treatment of congenital nasolacrimal duct obstruction

- Massage of nasolacrimal duct and antibiotic drops 4 times daily
- Improvement by age 12 months in 95% of cases



- If no improvement - probe at 12-18 months
- Results - 90% cure by first probing and 6% by second

Acute dacryocystitis

Usually secondary to nasolacrimal duct obstruction



- Tender canthal swelling
- Mild preseptal cellulitis



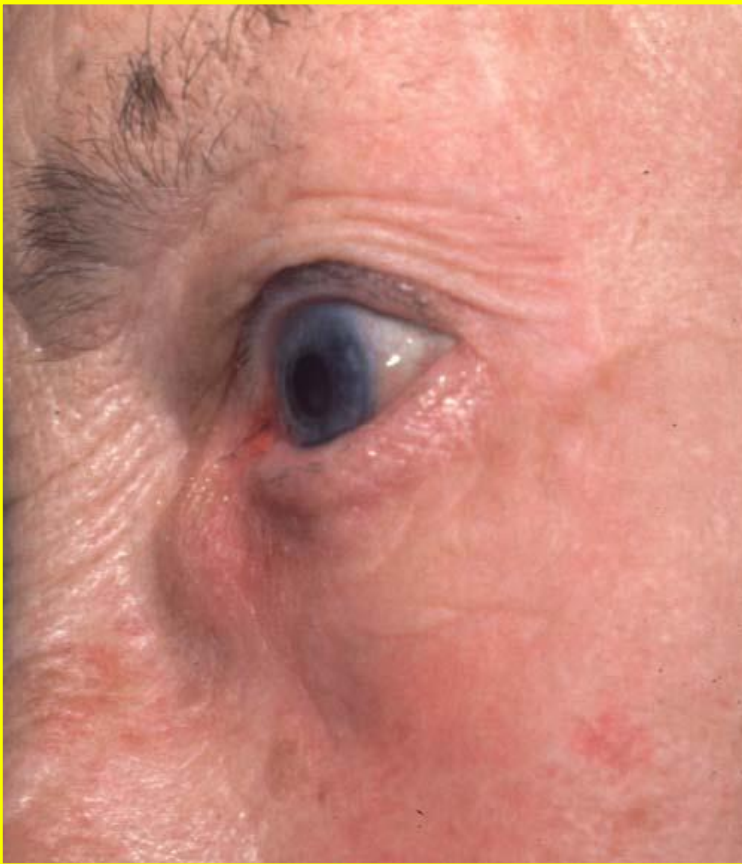
- May develop into abscess

Treatment

- Systemic antibiotics and warm compresses
- DCR after acute infection is controlled

Chronic dacryocystitis

Epiphora and chronic or recurrent unilateral conjunctivitis



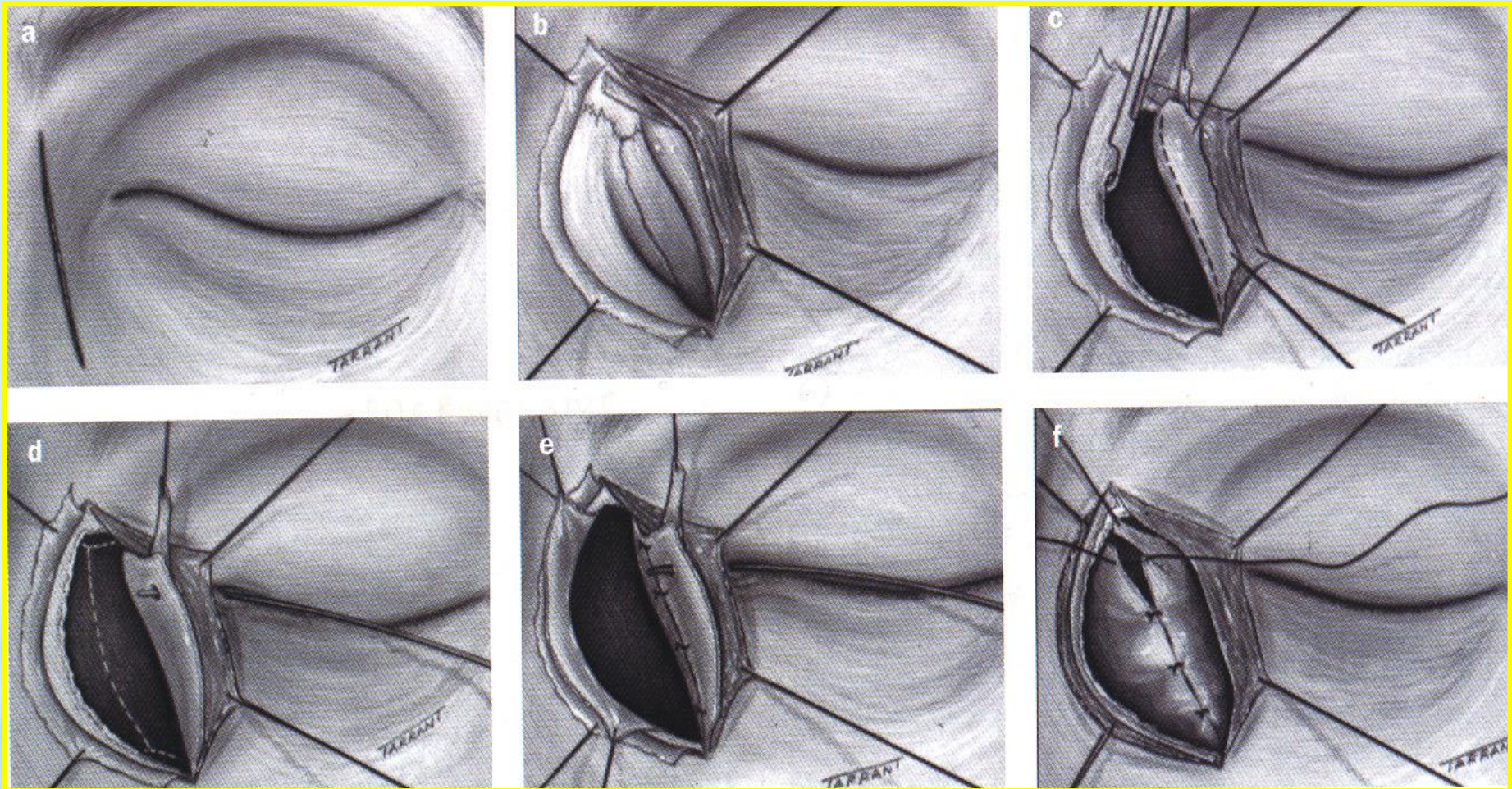
Painless swelling at inner canthus



Expressed mucopurulent material

Treatment - DCR

Dacryocystorhinostomy



Orbital cellulitis

- **Infection behind orbital septum**
- **Usually secondary to ethmoiditis**
- **Presentation - severe malaise, fever and orbital signs**

Signs



- **Severe eyelid oedema and redness**
- **Proptosis - most frequently lateral and down**
- **Painful ophthalmoplegia**
- **Optic nerve dysfunction if advanced**

Management of orbital cellulitis



Pre-treatment



Post-treatment

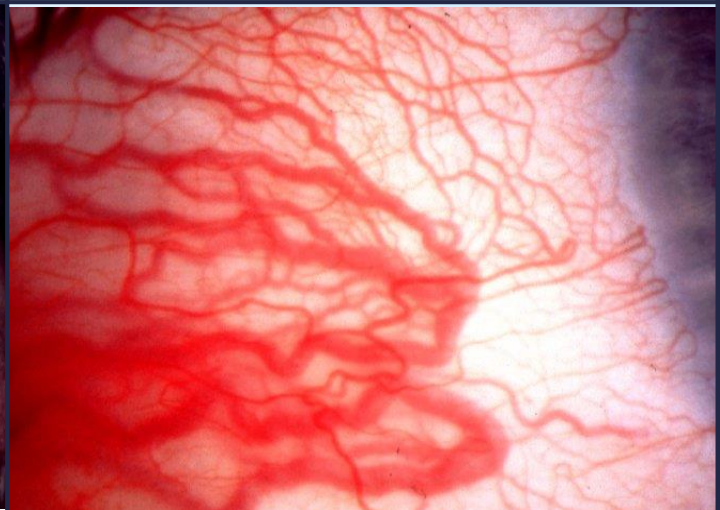
1. Hospital admission
2. Systemic antibiotic therapy
3. Monitoring of optic nerve function
4. Indications for surgery
 - Resistance to antibiotics
 - Orbital or subperiosteal abscess
 - Optic neuropathy

Thyroid Ophthalmopathy

Periorbital and lid swelling



Conjunctival hyperaemia



Chemosis



**Superior limbic
keratoconjunctivitis**



Signs of eyelid retraction

Occurs in about 50%



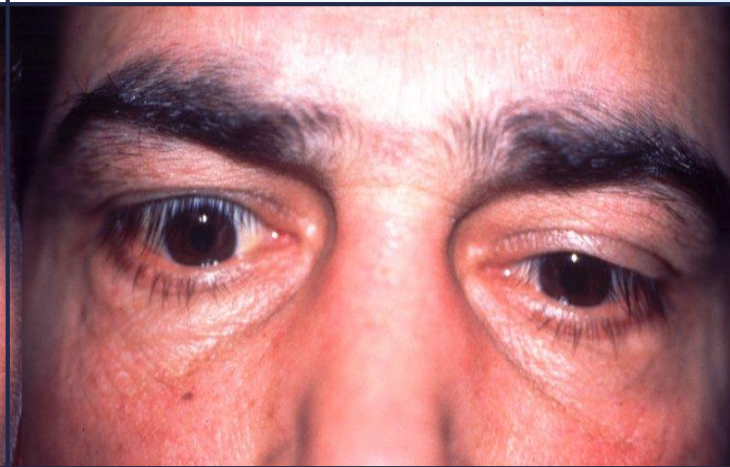
- **Bilateral lid retraction**
- **No associated proptosis**



- **Bilateral lid retraction**
- **Bilateral proptosis**



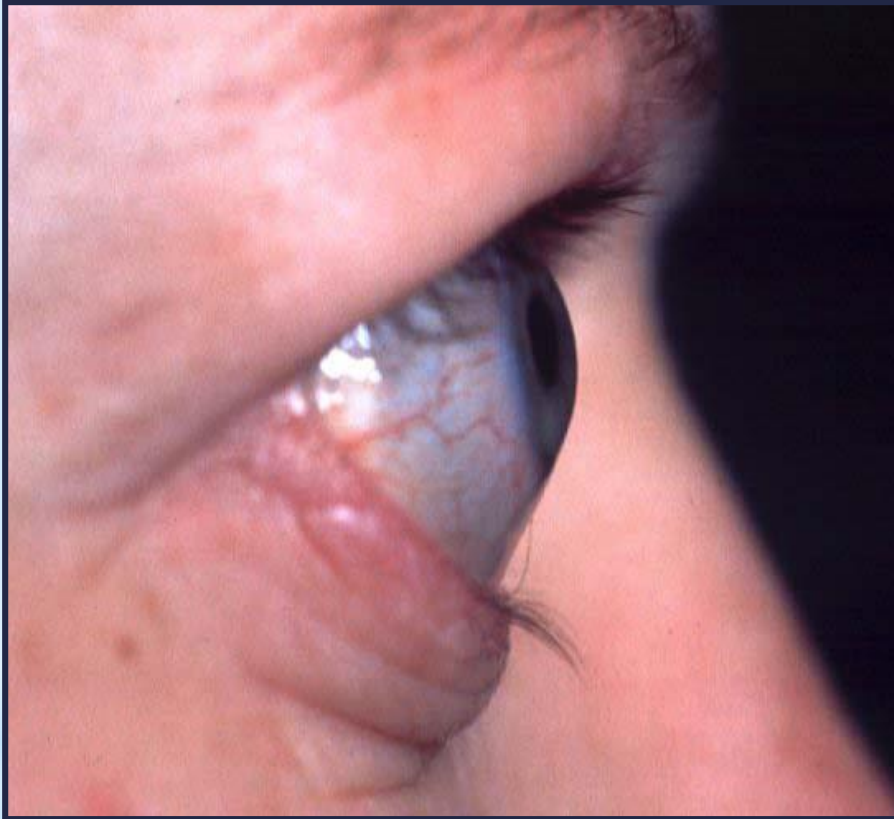
- **Unilateral lid retraction**
- **Unilateral proptosis**



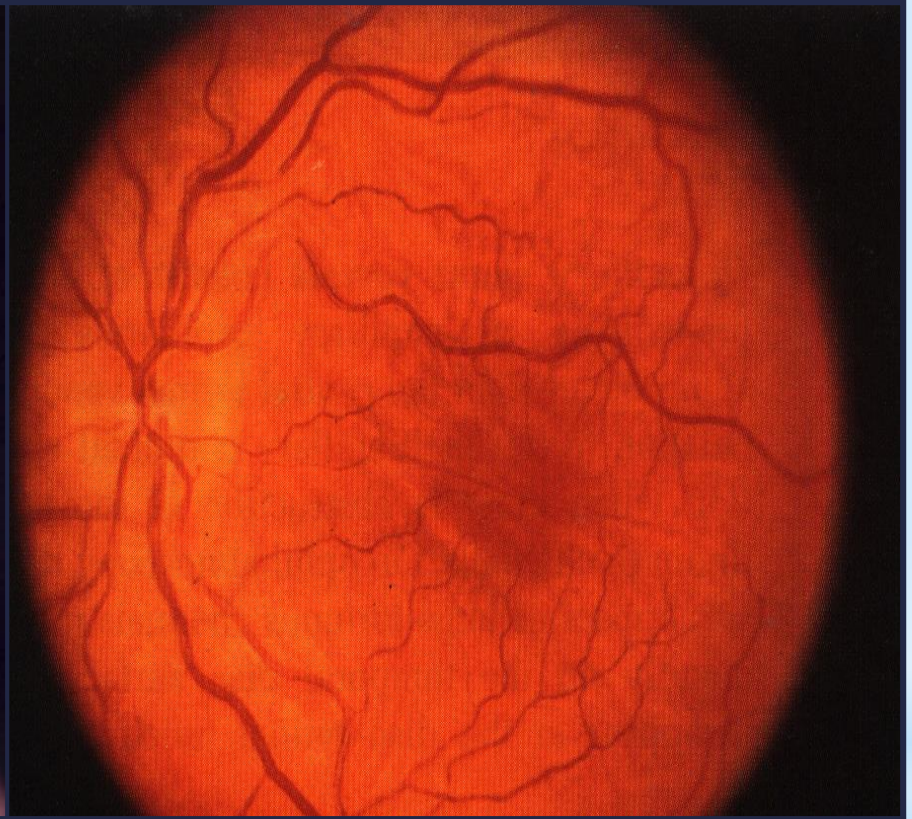
- **Lid lag in downgaze**

Proptosis

- Occurs in about 50%
- Uninfluenced by treatment of hyperthyroidism



Axial and permanent in about 70%



May be associated with choroidal folds

Treatment options

- Systemic steroids
- Radiotherapy
- Surgical decompression

Superficial dermoid cyst

- **Presents in infancy**
- **No displacement of globe**



- **Most commonly superotemporal**
- **Freely mobile under skin**



- **Occasionally superonasal**
- **Posterior margins are easily palpable**

CONJUNCTIVA

CONJUNCTIVAL INFECTIONS

1. Bacterial

- Simple bacterial conjunctivitis
- Gonococcal keratoconjunctivitis

2. Viral

- Adenoviral keratoconjunctivitis
- Molluscum contagiosum conjunctivitis
- Herpes simplex conjunctivitis

3. Chlamydial

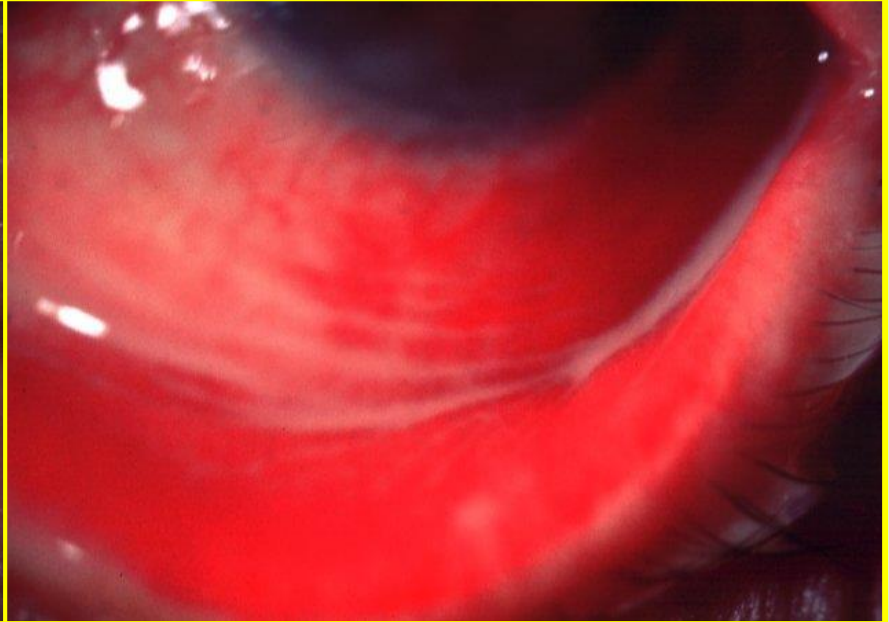
- Adult chlamydial keratoconjunctivitis
- Neonatal chlamydial conjunctivitis
- Trachoma

Simple bacterial conjunctivitis

Signs



Crusted eyelids and conjunctival injection



Subacute onset of mucopurulent discharge

Treatment - broad-spectrum topical antibiotics

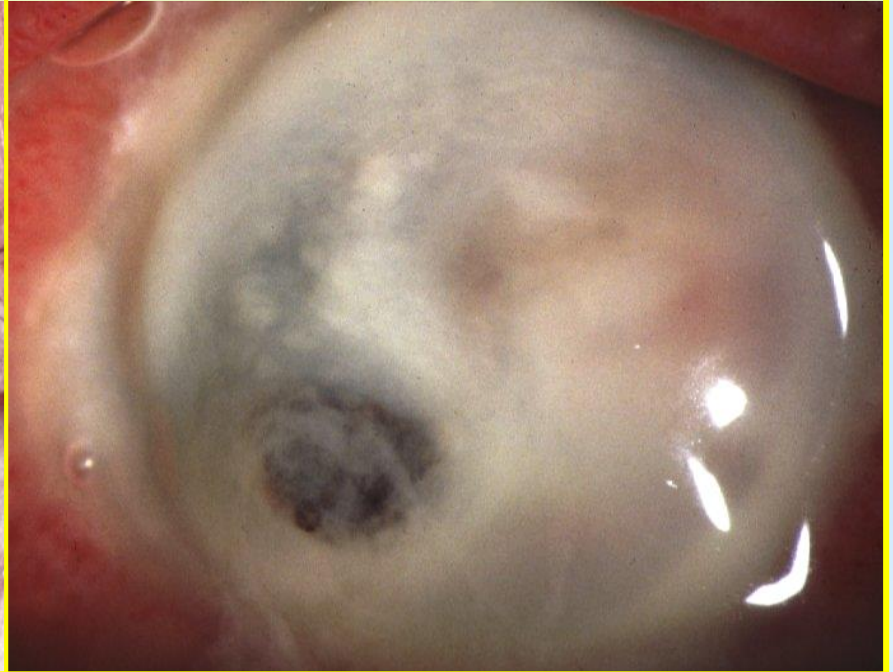
Gonococcal keratoconjunctivitis

Signs



Acute, profuse, purulent discharge, hyperaemia and chemosis

Complications



Corneal ulceration, perforation and endophthalmitis if severe

Treatment

- Topical gentamicin and bacitracin
- Intravenous cefoxitin or cefotaxime

Adenoviral Keratoconjunctivitis

1. Pharyngoconjunctival fever

- Adenovirus types 3 and 7
- Typically affects children
- Upper respiratory tract infection
- Keratitis in 30% - usually mild

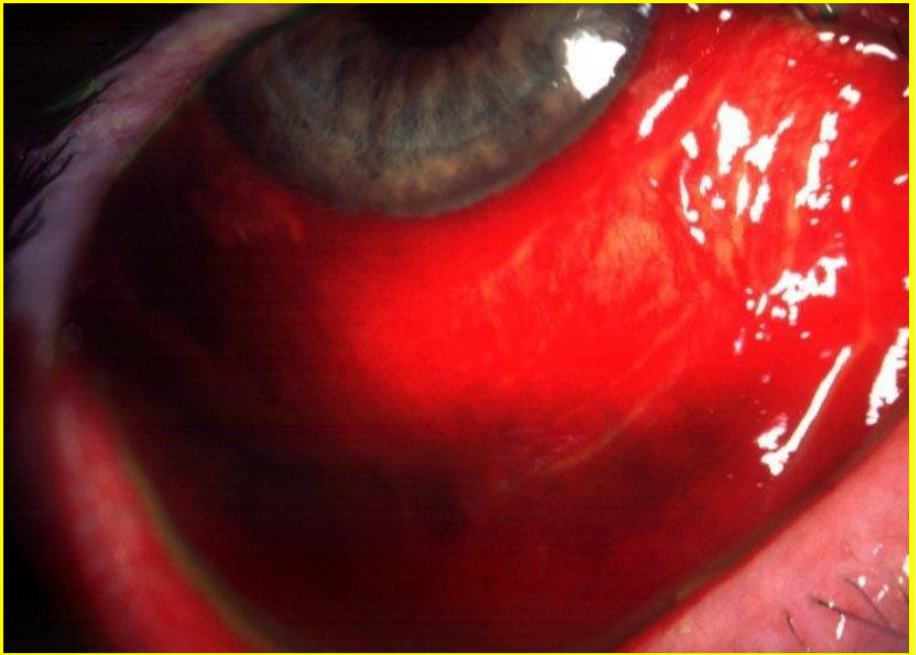
2. Epidemic keratoconjunctivitis

- Adenovirus types 8 and 19
- Very contagious
- No systemic symptoms
- Keratitis in 80% of cases - may be severe

Signs of conjunctivitis



Usually bilateral, acute watery discharge and follicles



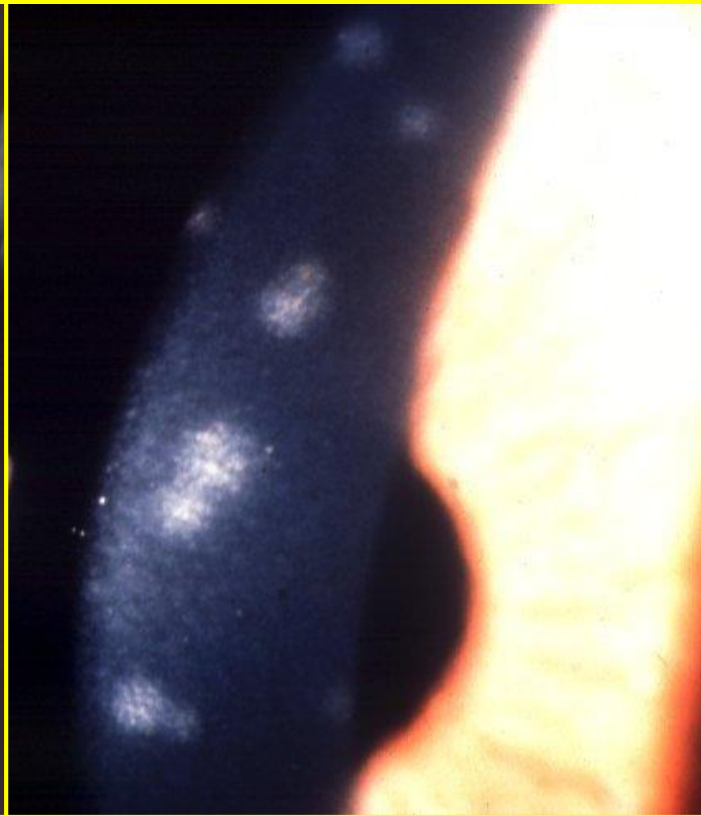
Subconjunctival haemorrhages and pseudomembranes if severe

Treatment - symptomatic

Signs of keratitis



- Focal, epithelial keratitis
 - Transient



- Focal, subepithelial keratitis
 - May persist for months

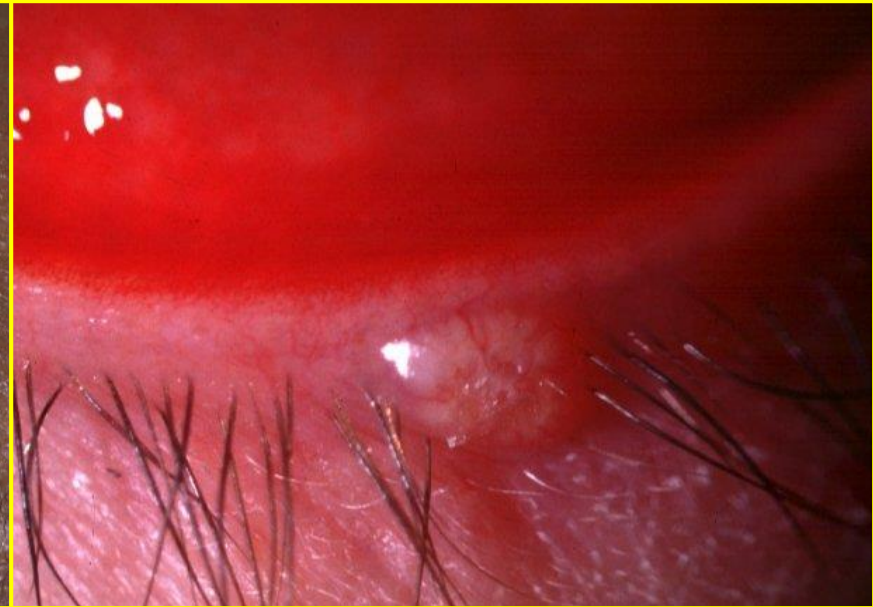
Treatment - topical steroids if visual acuity diminished by subepithelial keratitis

Molluscum contagiosum conjunctivitis

Signs



- Waxy, umbilicated eyelid nodule
 - May be multiple



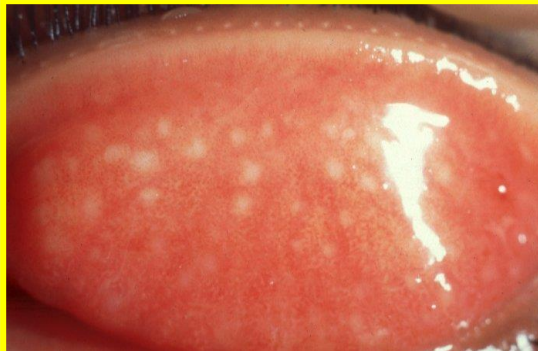
- Ipsilateral, chronic, mucoid discharge
 - Follicular conjunctivitis

Treatment - destruction of eyelid lesion

Trachoma

- Infection with serotypes A, B, Ba and C of *Chlamydia trachomatis*
- Fly is major vector in infection-reinfection cycle

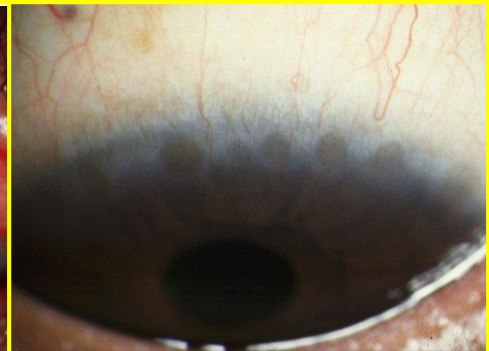
Progression



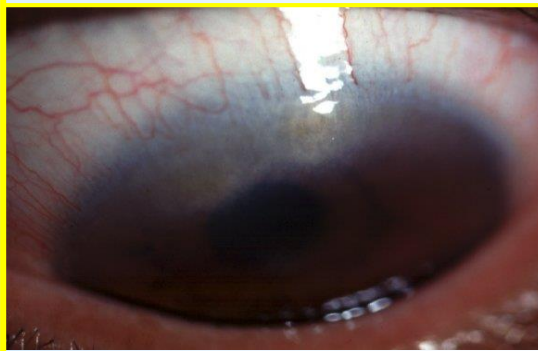
Acute follicular conjunctivitis



Conjunctival scarring (Arlt line)



Herbert pits



Pannus formation



Trichiasis



Cicatricial entropion

Treatment - systemic Azithromycin

ALLERGIC CONJUNCTIVITIS

1. Vernal keratoconjunctivitis
2. Atopic keratoconjunctivitis

Vernal keratoconjunctivitis

Frequently associated with atopy: asthma, hay fever and dermatitis



- Recurrent, bilateral
- Affects children and young adults
- More common in males and in warm climates
- Itching, mucoid discharge and lacrimation

Types

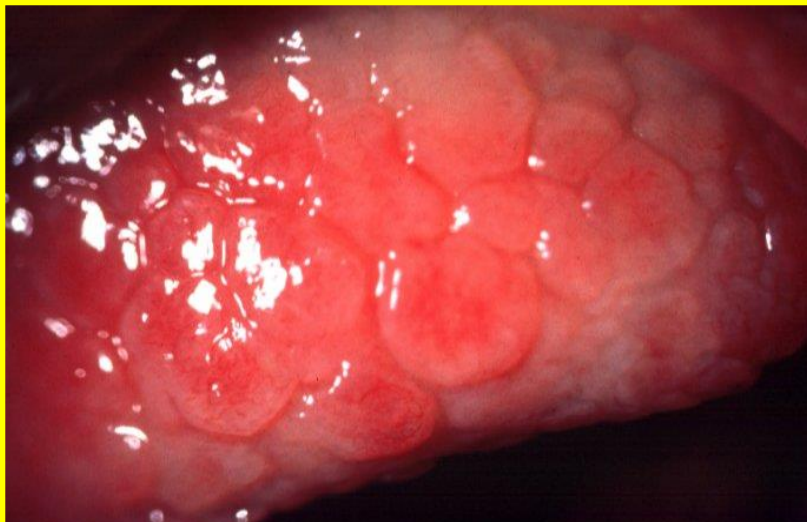
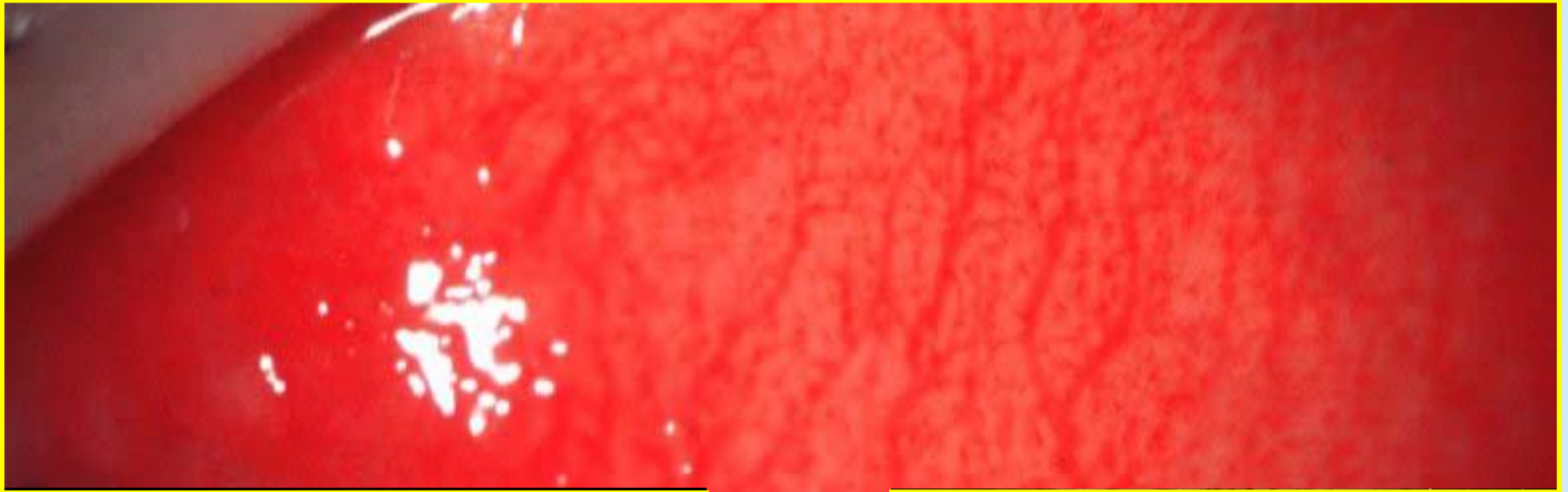
- Palpebral
- Limbal
- Mixed

Treatment

- Topical mast cell stabilizers
- Topical steroids

Progression of vernal conjunctivitis

Diffuse papillary hypertrophy, most marked on superior tarsus

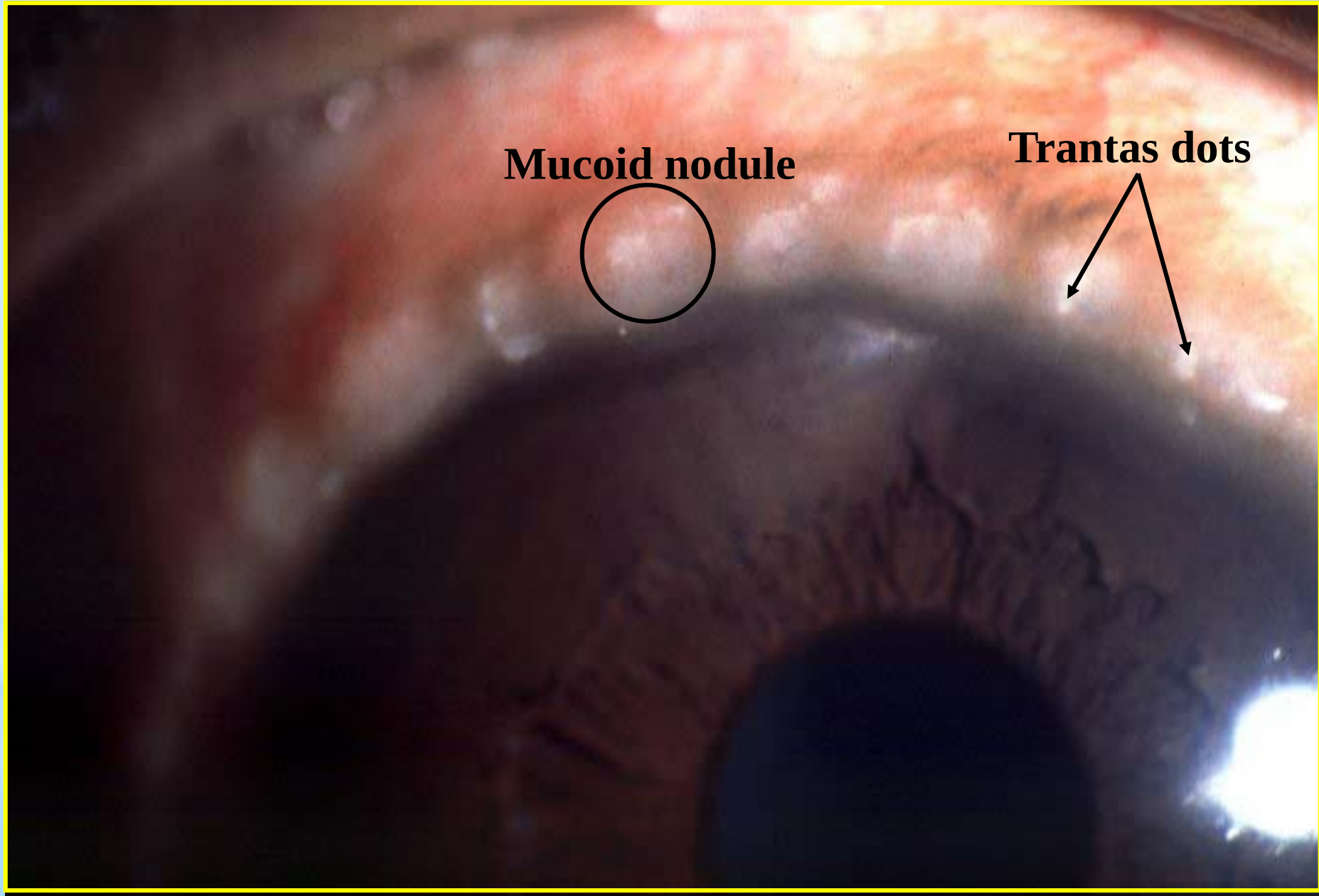


Formation of cobblestone papillae



Rupture of septae - giant papillae

Limbal vernal



Atopic keratoconjunctivitis



Typically affects young patients with atopic dermatitis



Eyelids are red, thickened, macerated and fissured

CONJUNCTIVAL TUMOURS

1. Benign

- Naevus
- Papilloma
 - Epibulbar dermoid
- Lipodermoid

2. Pre-malignant

- Primary acquired melanosis (PAM)
- Intraepithelial neoplasia (carcinoma *in situ*)

3. Malignant

- Melanoma
- Squamous cell carcinoma
 - Kaposi sarcoma

Conjunctival Naevus



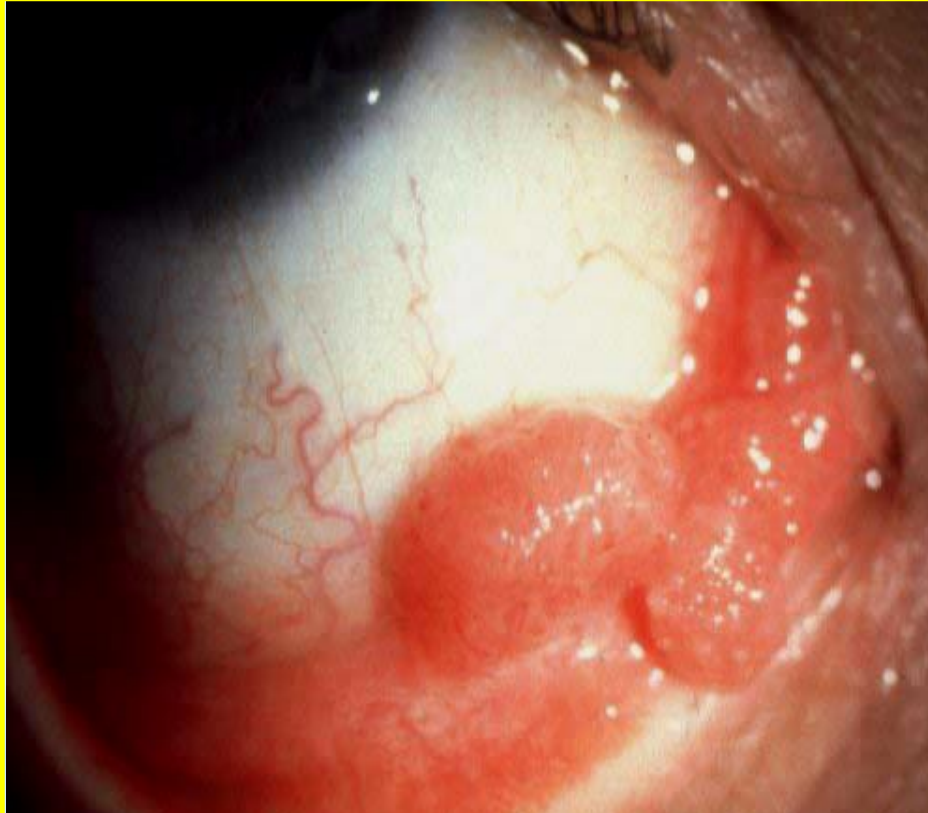
- Presents in first two decades
- Sharply demarcated and slightly elevated



- Most frequently juxtalimbal
- 30% are almost non-pigmented

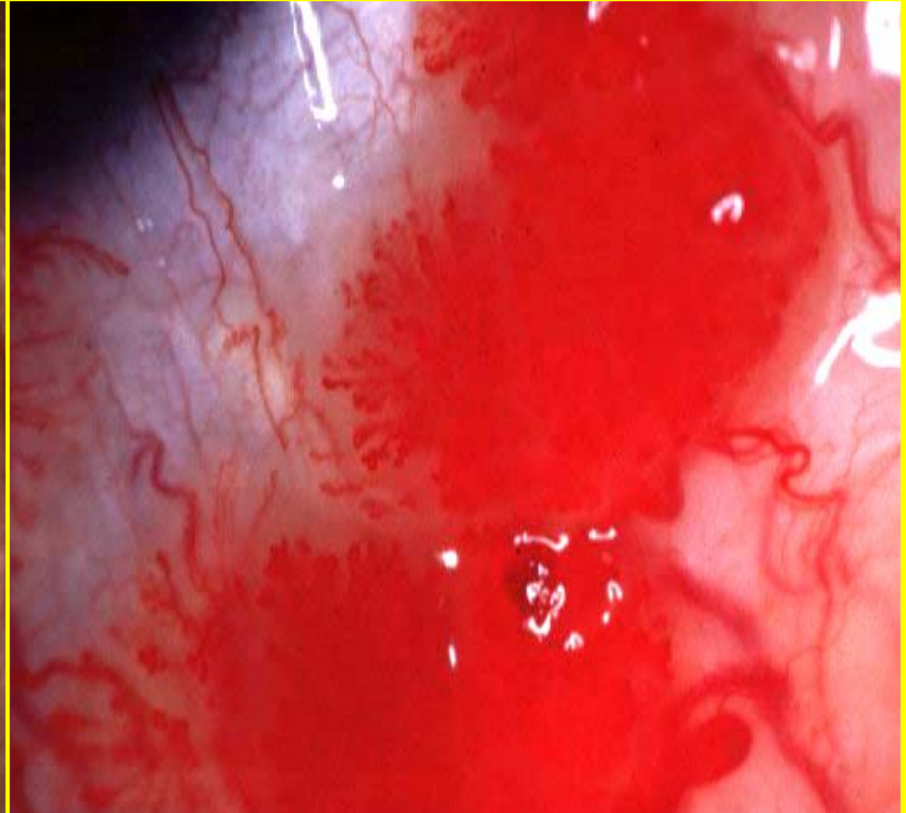
Papilloma

Pedunculated



- Presents in childhood or early adulthood
- Infection with papilloma virus
 - May be multiple and bilateral

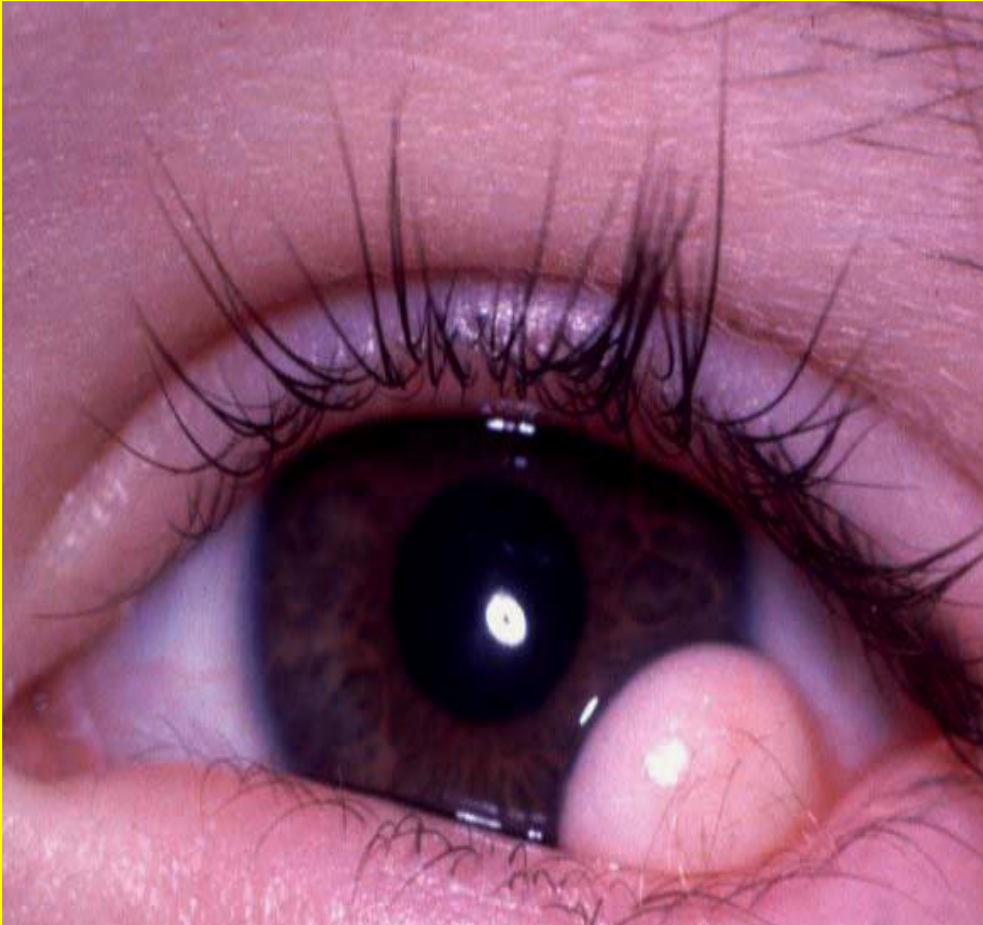
Sessile



- Presents in middle age
- Not caused by infection
 - Single and unilateral

Epibulbar dermoid

Signs



- Presents in childhood
- Smooth, soft mass
- Usually juxtalimbal

Association



- Occasionally Goldenhar syndrome

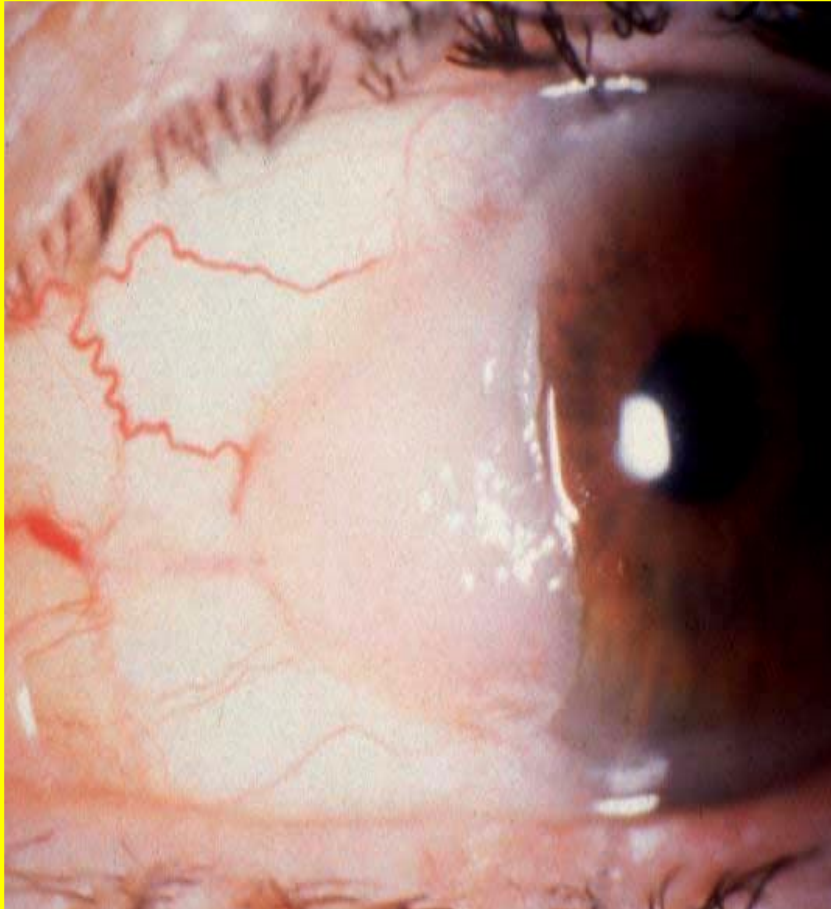
Lipodermoid



- Presents in adulthood
- Soft, movable, subconjunctival mass
- Most frequently at outer canthus

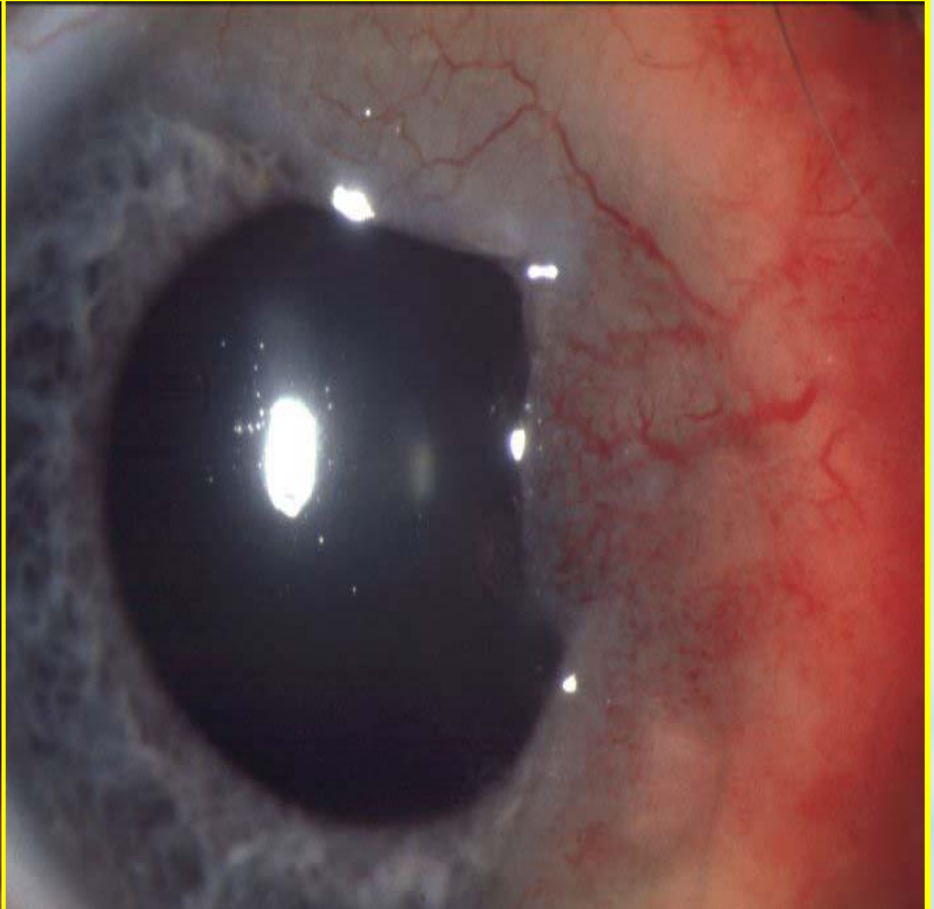
Intraepithelial neoplasia (carcinoma *in situ*)

Signs



- Presents in late adulthood
- Juxtalimbal fleshy avascular mass

Progression



- May become vascular and extend onto cornea
- Malignant transformation is uncommon

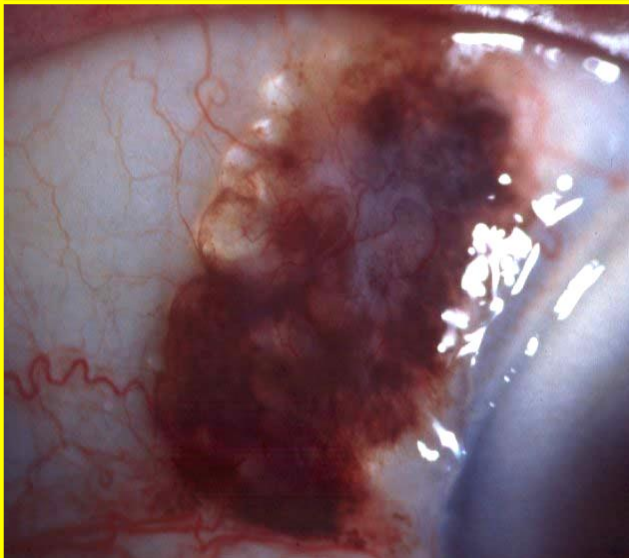
Conjunctival melanoma

From PAM with atypia



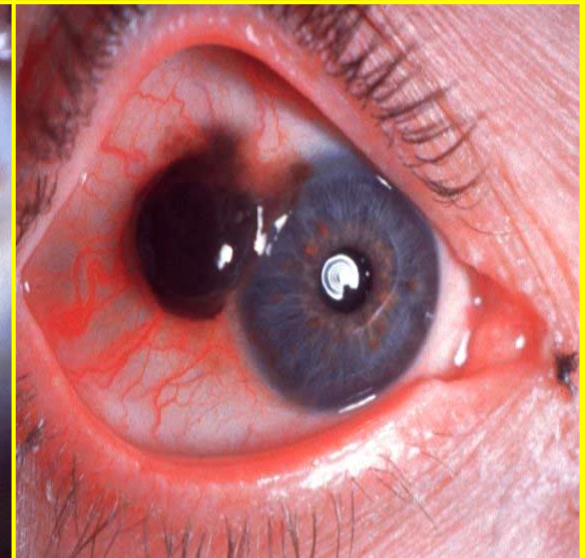
- Most common type
- Sudden appearance of nodules in PAM

From naevus



- Very rare
- Sudden increase in size or pigmentation

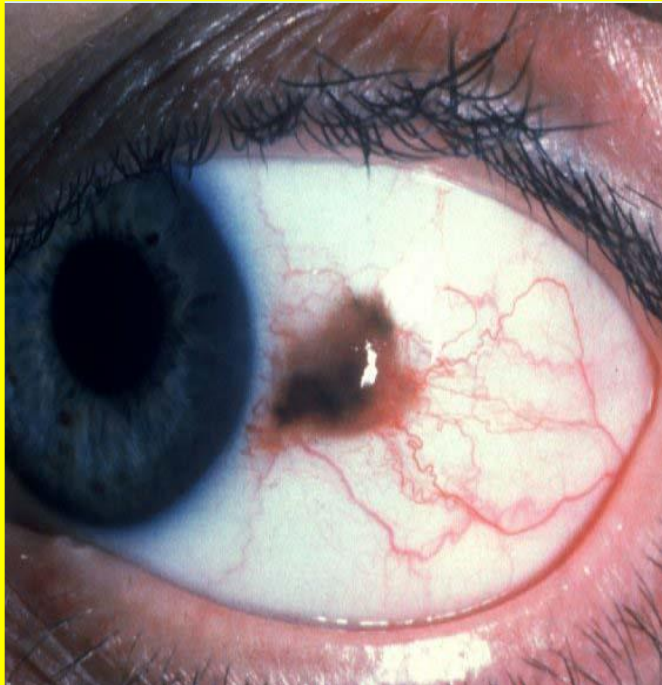
Primary



- Solitary nodule
- Frequently juxtalimbal but may be anywhere

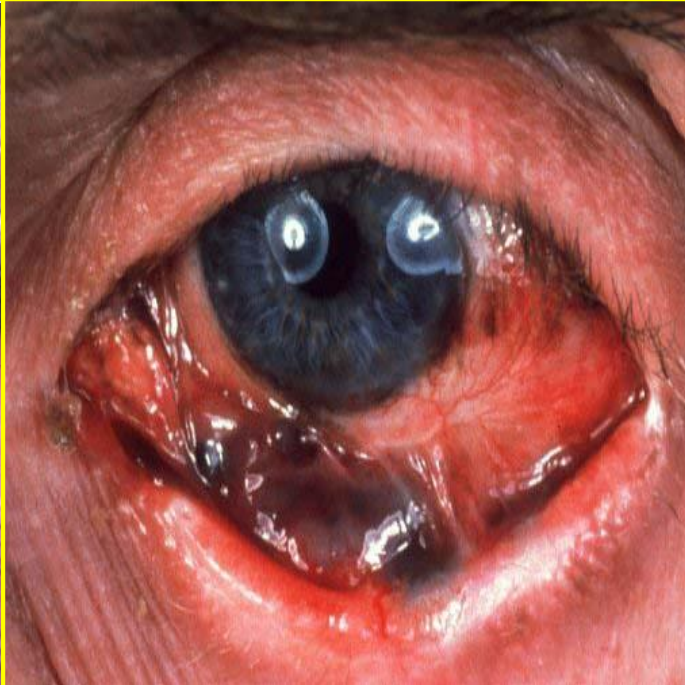
Treatment of conjunctival melanoma

Localized tumour



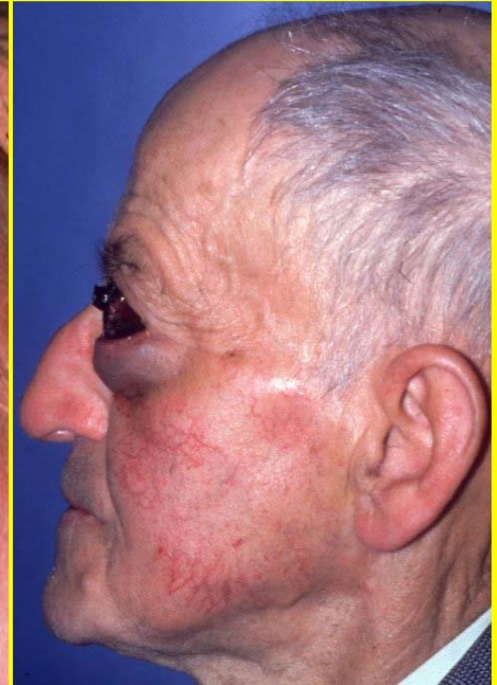
- Excision
- Adjunctive cryotherapy

Diffuse tumour



- Excision of nodules
- Adjunctive cryotherapy or mitomycin C

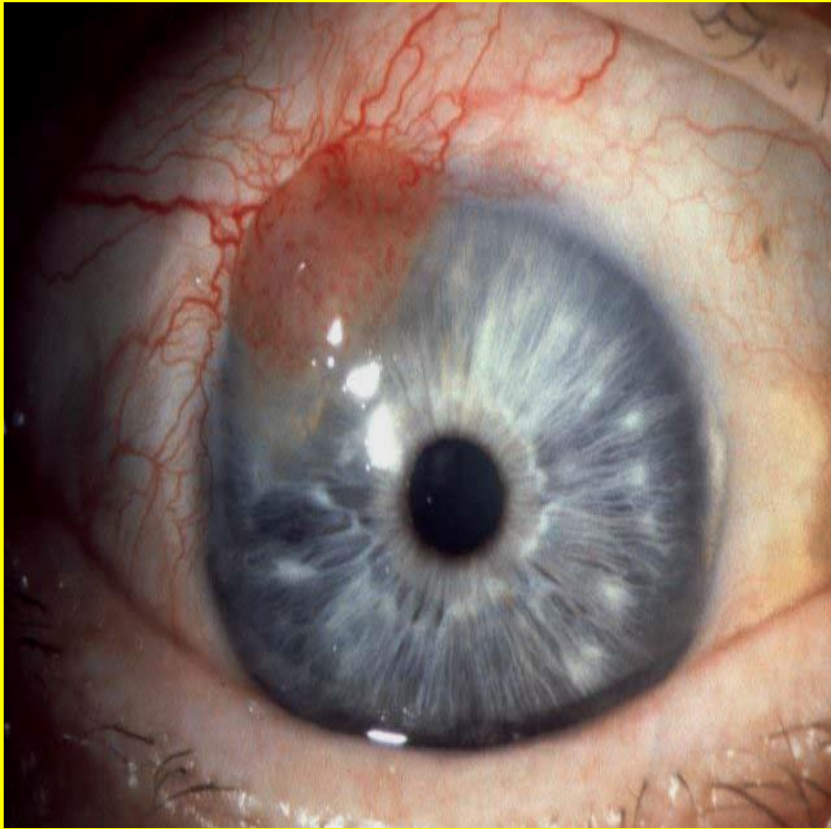
Orbital recurrence



- Excision and radiotherapy
- Exenteration

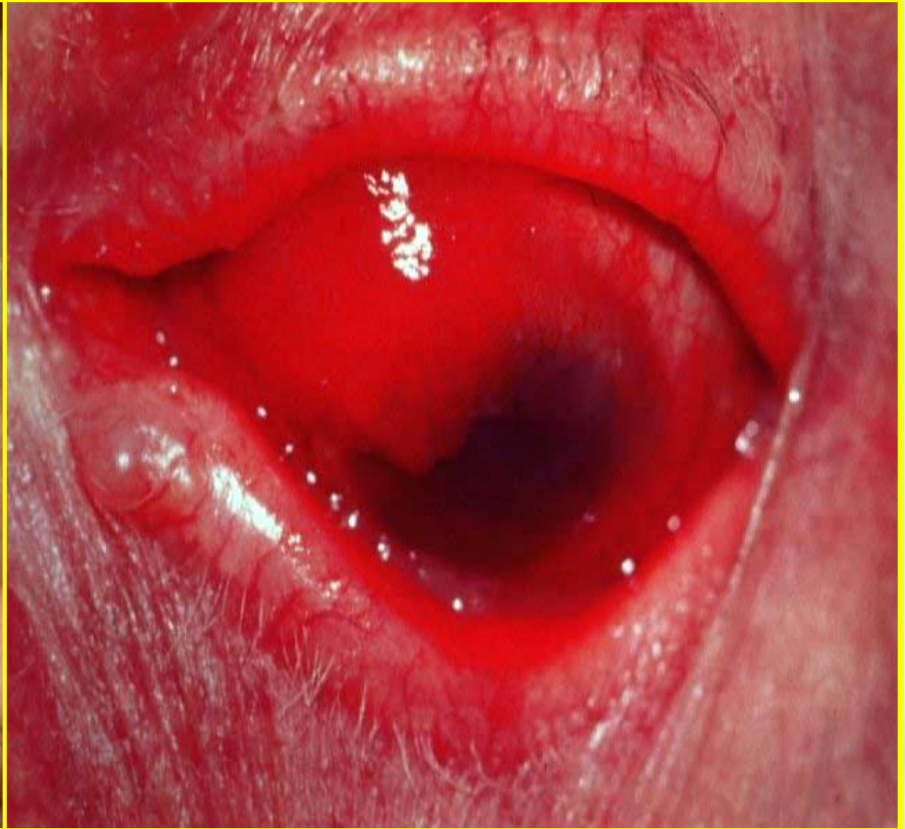
Squamous cell carcinoma

Signs



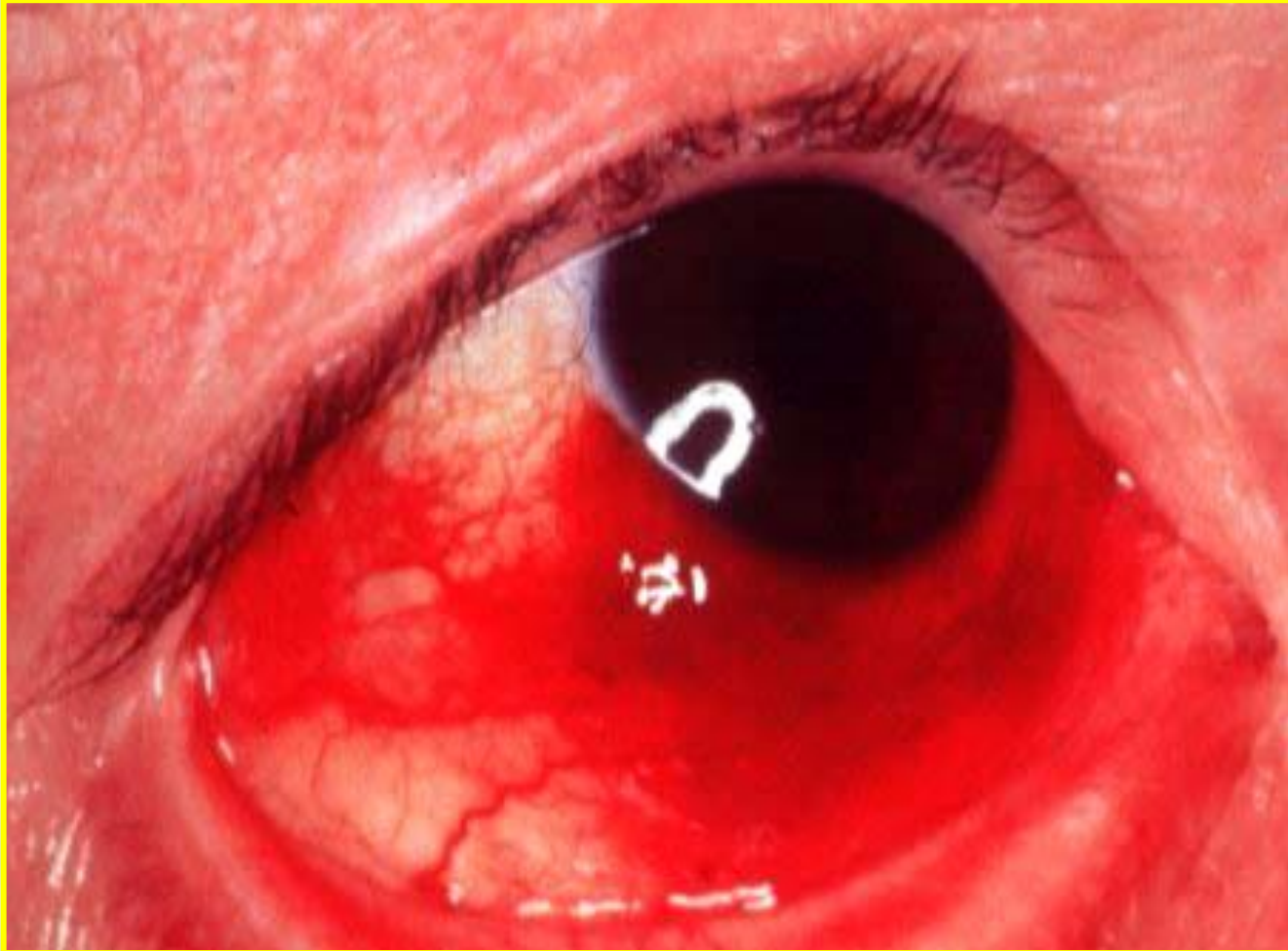
- Arises from intraepithelial neoplasia or *de novo*
- Presents in late adulthood
- Frequently juxtalimbal

Progression



- Slow-growing
- May spread extensively
- Rarely metastasizes

Kaposi sarcoma



- Affects patients with AIDS
- Vascular, slow-growing tumour of low malignancy
 - Very sensitive to radiotherapy
 - Most frequently in inferior fornix

CORNEA

Transparency of the Cornea

1. Absence of blood vessels
2. Regular arrangement of lamellae
3. Corneal dehydration by Endothelium pump system
4. Demyelination of Nerve Fibers
5. Non-Keratinized epithelium

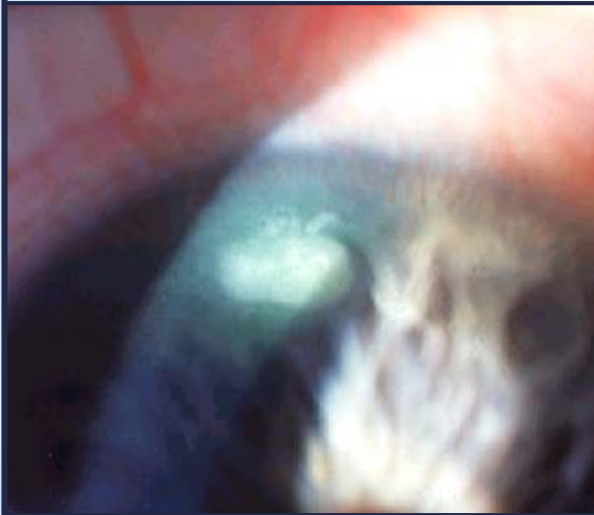
PERIPHERAL CORNEAL INFLAMMATION

Marginal keratitis

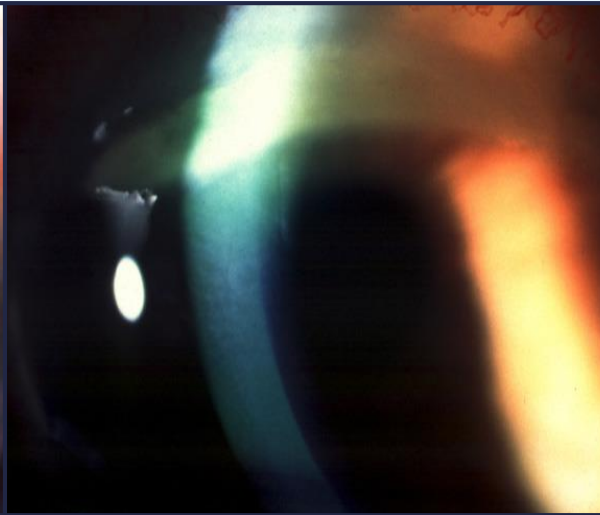
Marginal keratitis

- Hypersensitivity reaction to *Staph.* exotoxins
- May be associated with *Staph.* blepharitis
- Unilateral, transient but recurrent

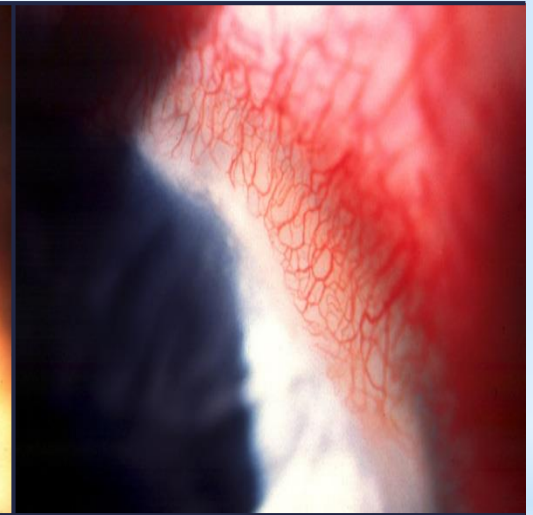
Progression



Subepithelial infiltrate
separated by clear zone



Circumferential spread



Bridging vascularization
followed by resolution

Treatment - short course of topical steroids

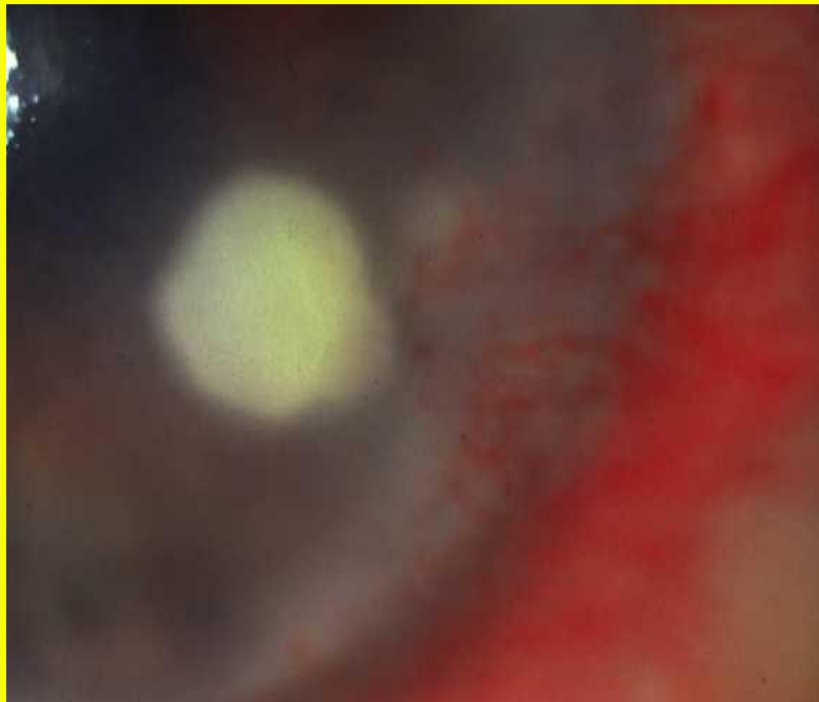
CORNEAL INFECTIONS

1. Bacterial keratitis
2. Fungal keratitis
3. Herpes simplex keratitis
 - Epithelial
 - Disciform
4. Herpes zoster keratitis

Bacterial keratitis

Predisposing factors

- Contact lens wear
- Chronic ocular surface disease
- Corneal hypoaesthesia



Expanding oval, yellow-white, dense stromal infiltrate



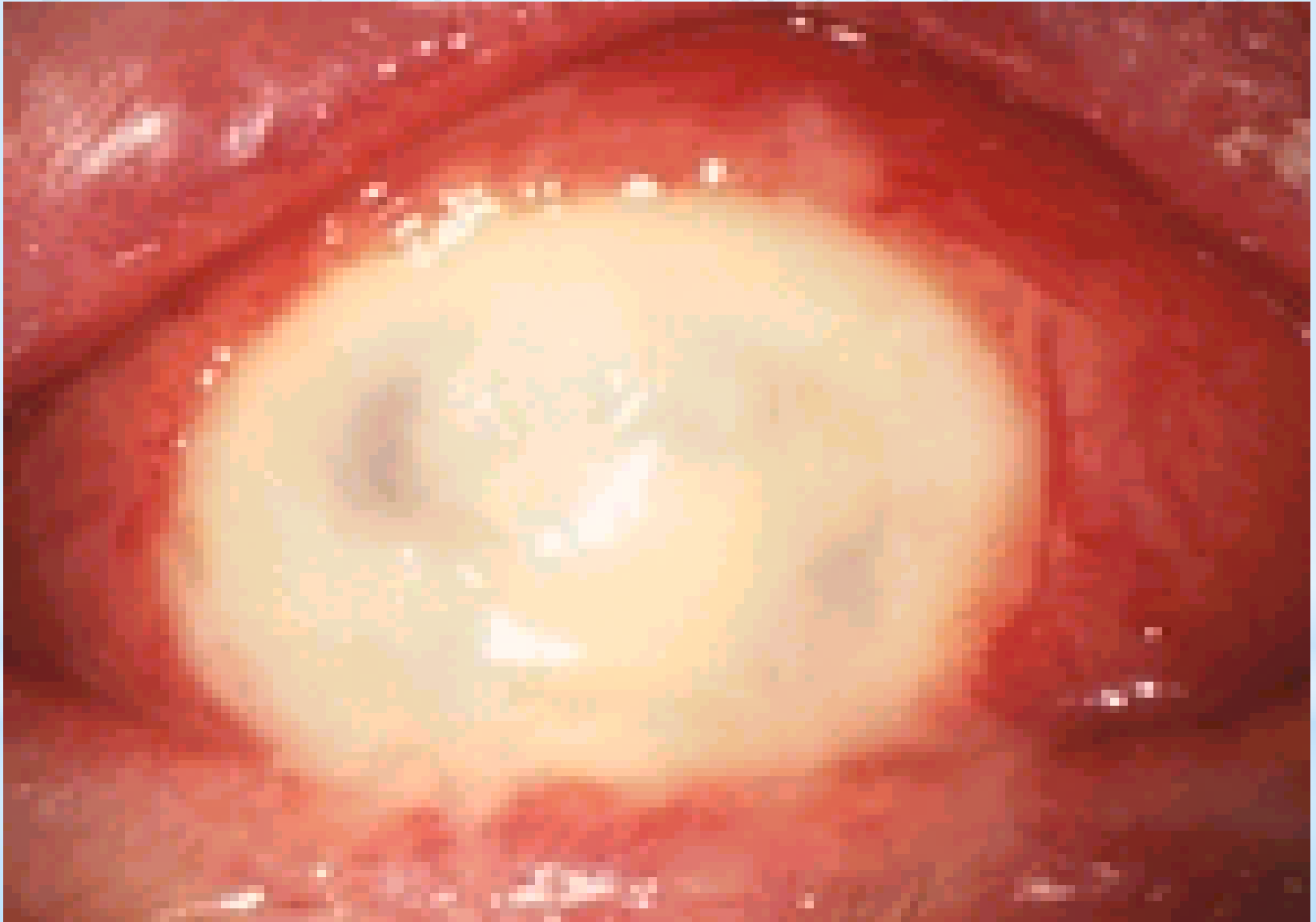
Stromal suppuration and hypopyon

Treatment - topical ciprofloxacin 0.3% or ofloxacin 0.3%

Corneal Ulcer with hypopyon



Severe bacterial keratitis with infectious scleritis



Abnormal Scars

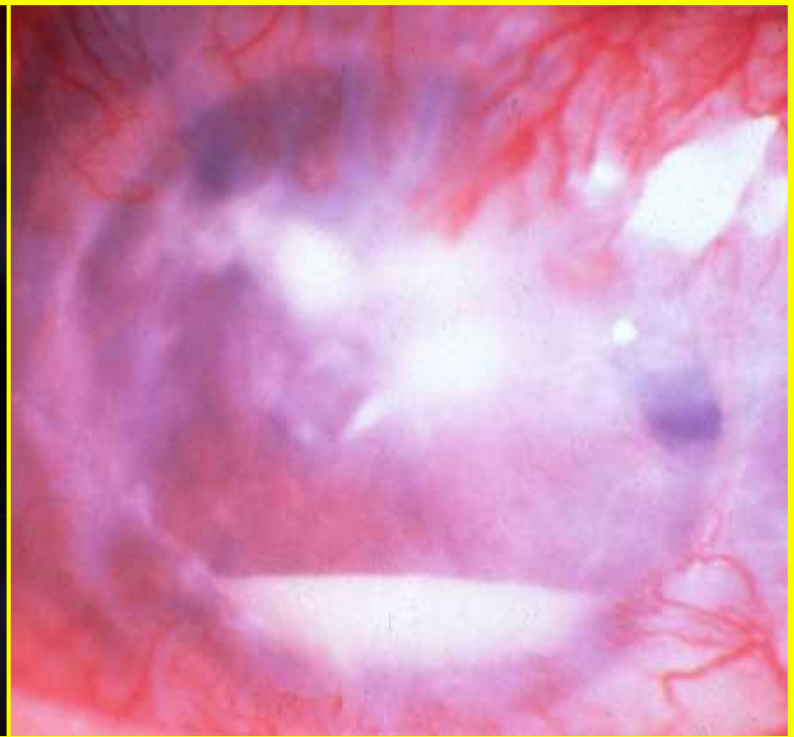


Fungal keratitis

Frequently preceded by ocular trauma with organic matter



Greyish-white ulcer which may be surrounded by feathery infiltrates

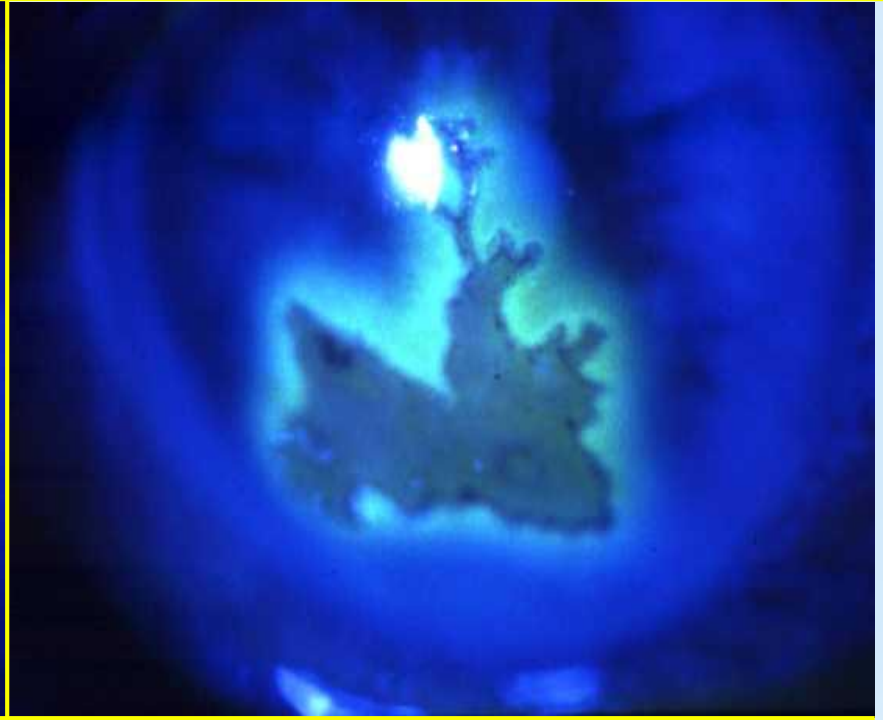
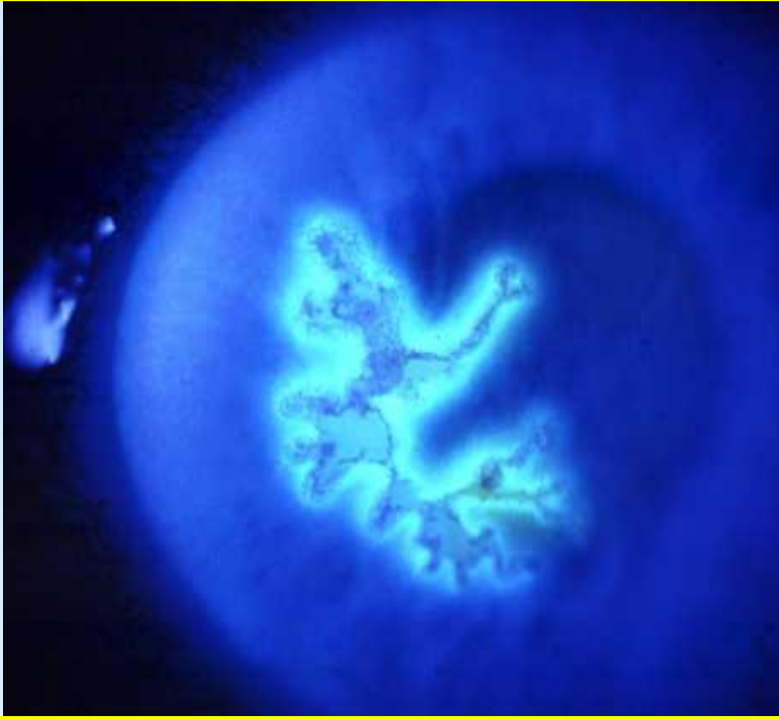


Slow progression and occasionally hypopyon

Treatment

- Topical antifungal agents
- Systemic therapy if severe
- Penetrating keratoplasty if unresponsive

Herpes simplex epithelial keratitis



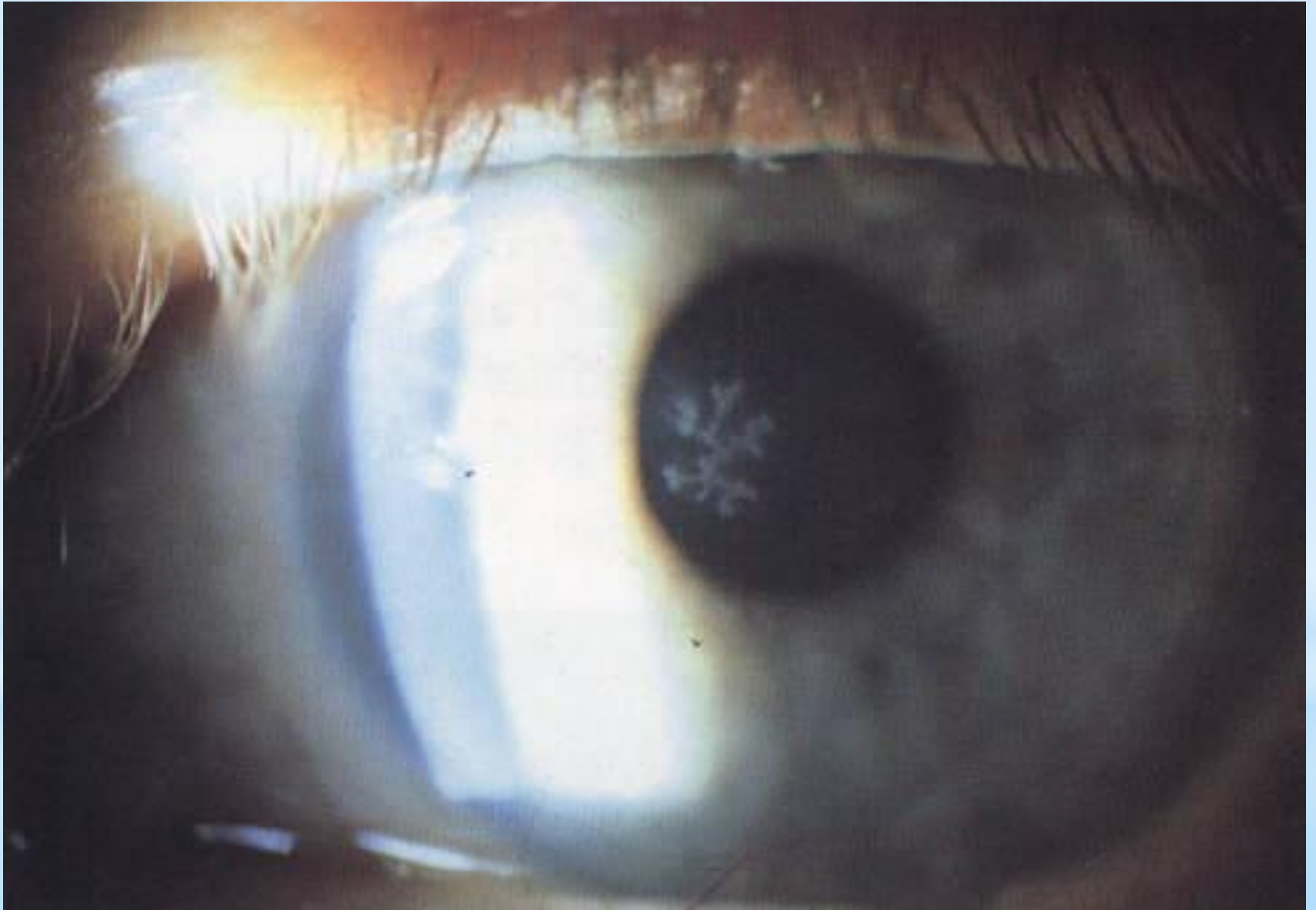
- Dendritic ulcer with terminal bulbs
- Stains with fluorescein

- May enlarge to become geographic

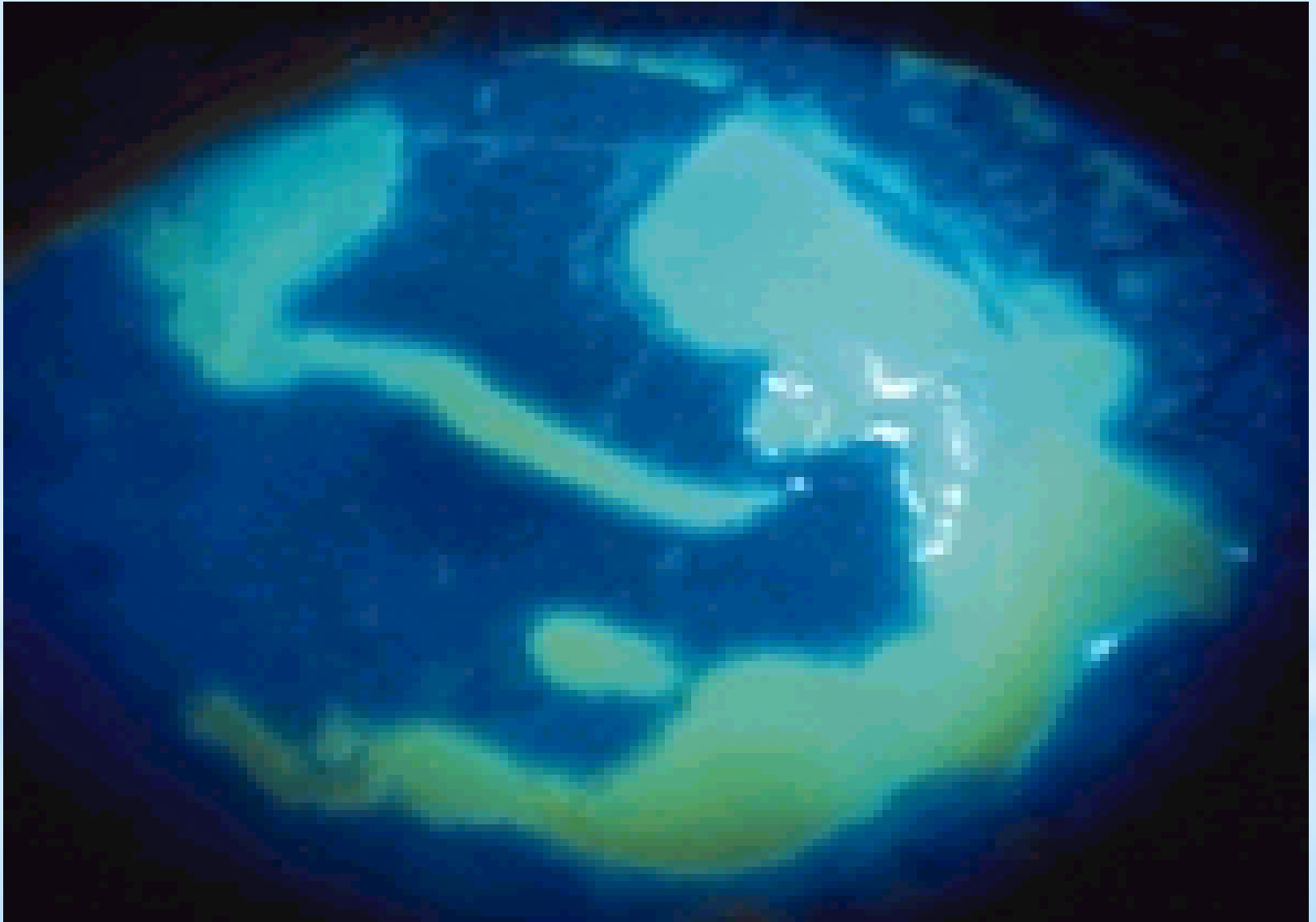
Treatment

- Aciclovir 3% ointment x 5 daily
- Trifluorothymidine 1% drops 2-hourly
- Debridement if non-compliant

Herpetic Dendritic Ulcer



Herpetic geographical ulcer



CORNEAL DEGENERATIONS

1. Age-related

- **Arcus senilis**

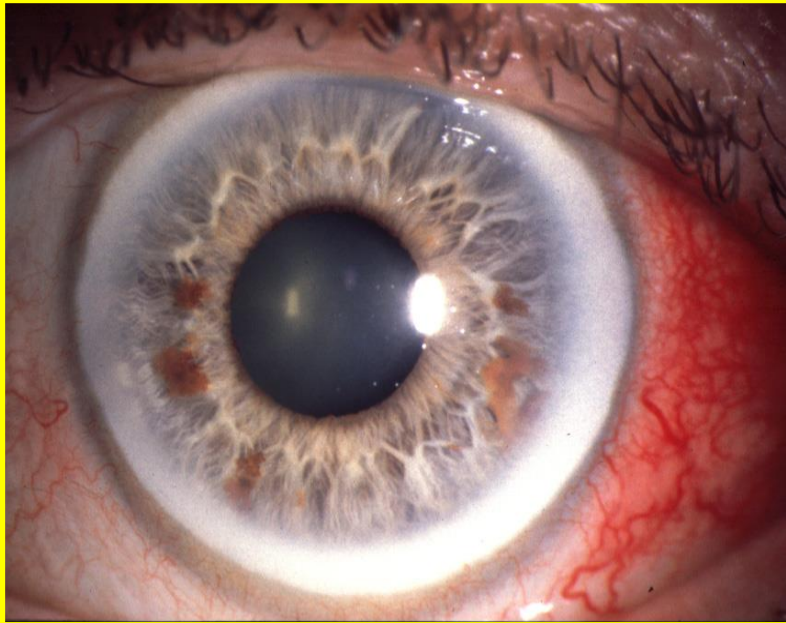
2. Lipid keratopathy

- **Primary**
- **Secondary**

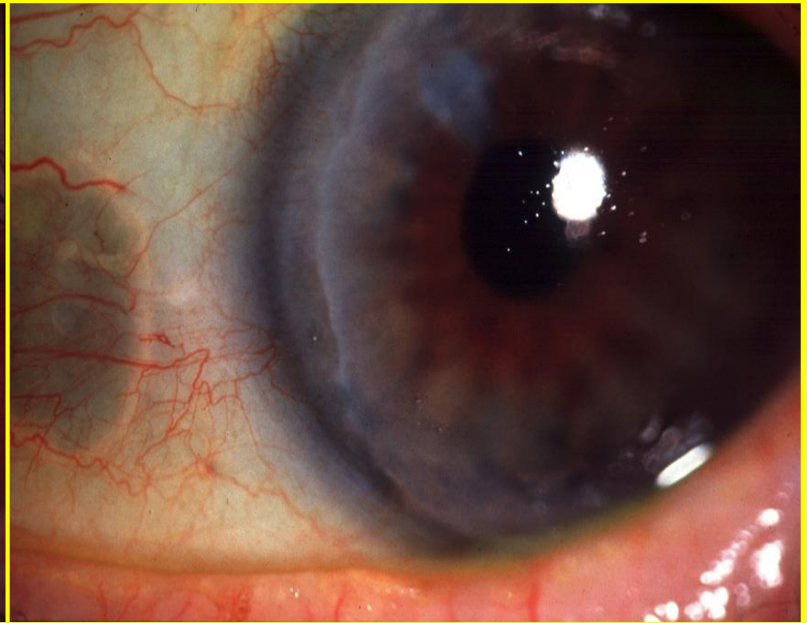
3. Band keratopathy

Arcus senilis

- Innocuous and extremely common in elderly
- Occasionally associated with hyperlipoproteinaemia



- Bilateral, circumferential bands of lipid deposits
- Diffuse central and sharp peripheral border



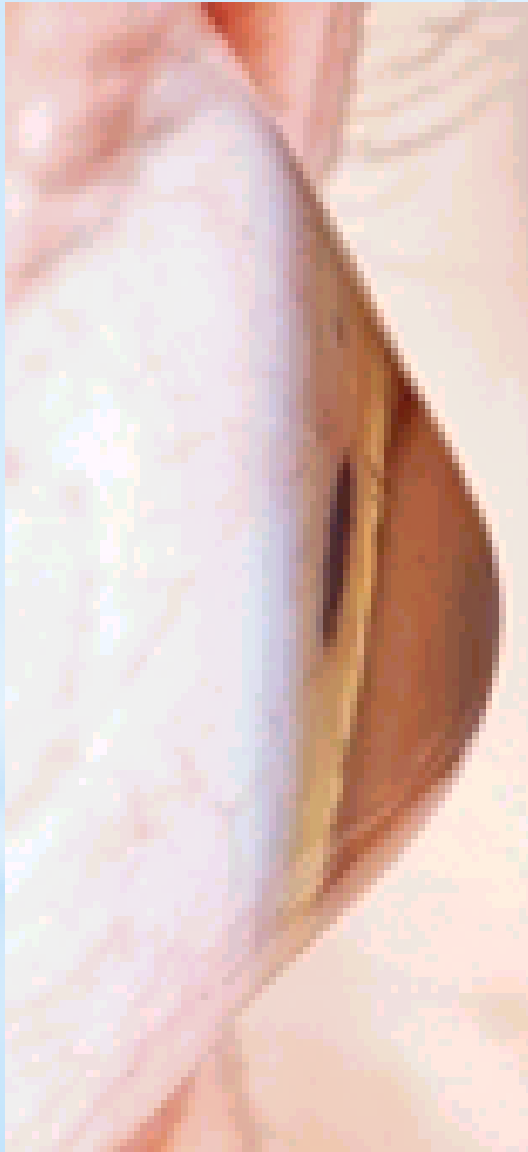
- Peripheral border separated from limbus by clear zone
- Clear zone may be thinned (senile furrow)

CORNEAL ECTASIAS

Keratoconus

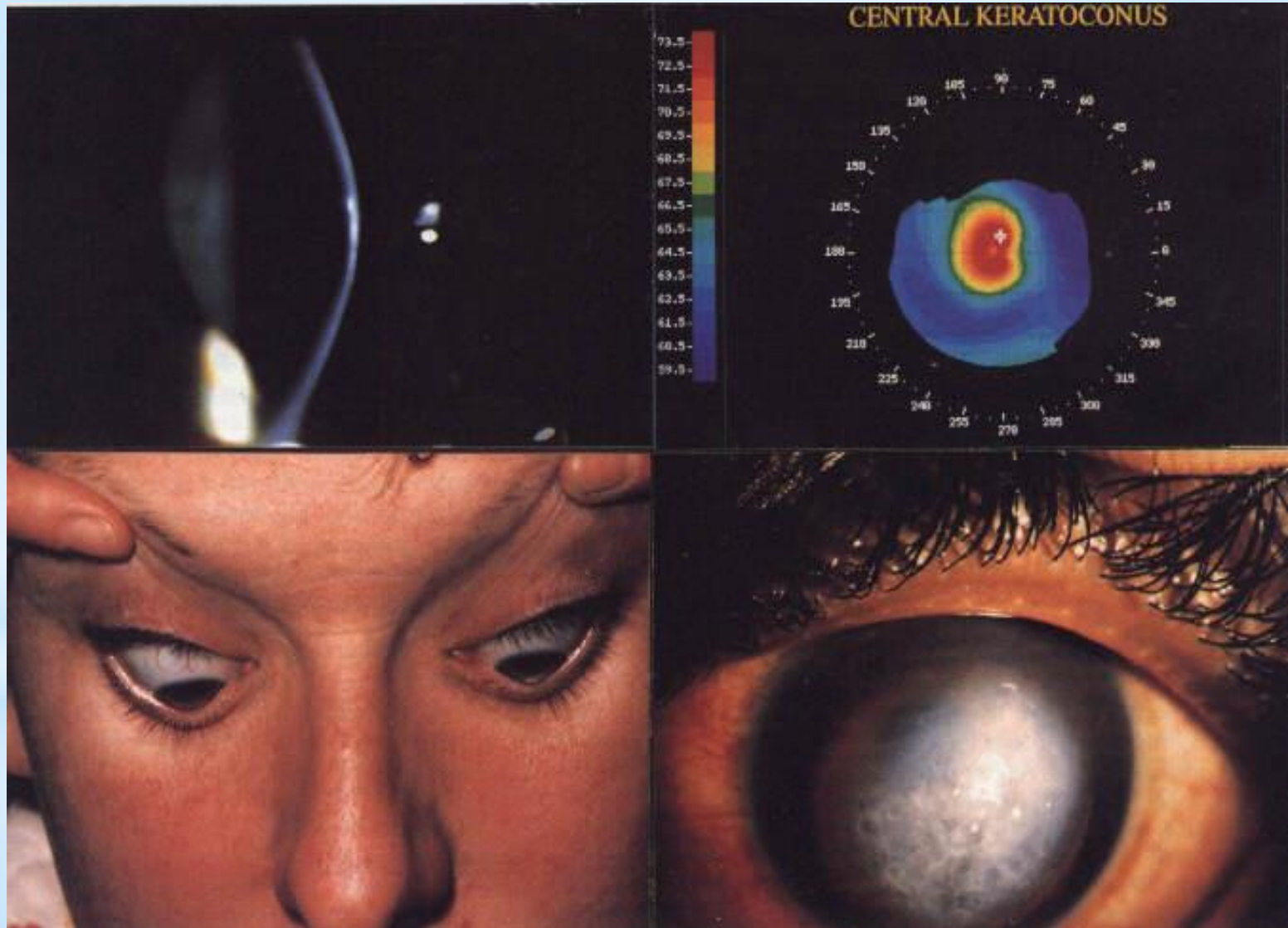
Keratoconus

Weakness of the cornea



Keratoconus:

Yogt's line; corneal mapping; Manson's sign; Hydrops



Manson's sign

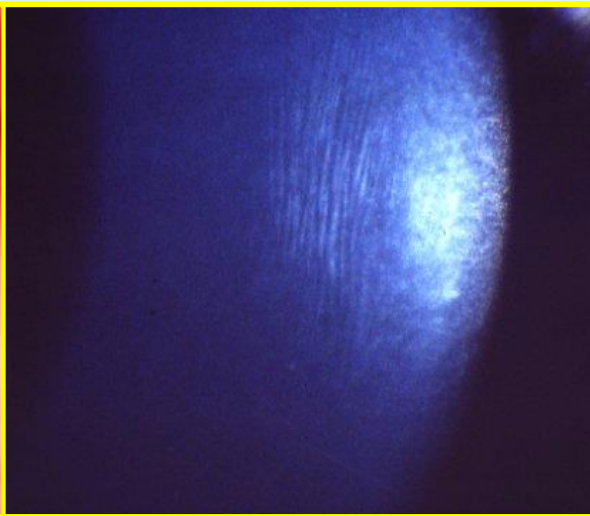


Signs of keratoconus

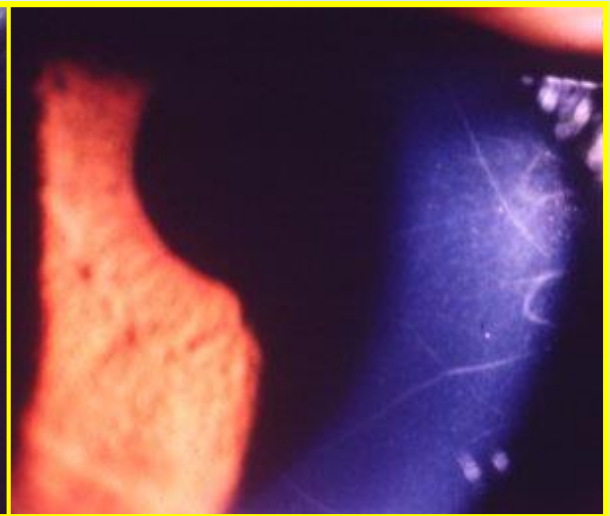
Bilateral in 85% but asymmetrical



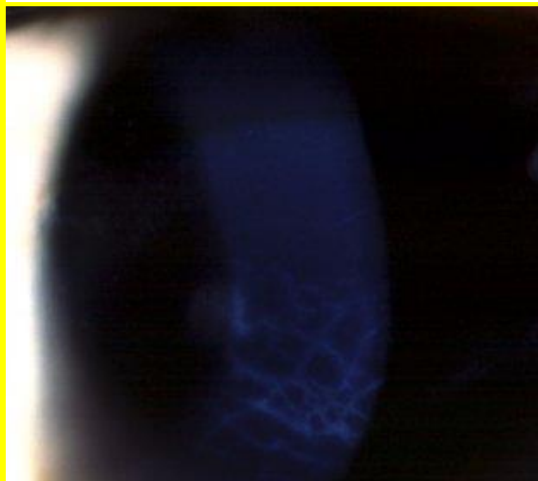
Oil droplet reflex



Vogt striae



Prominent corneal nerves



Fleischer ring & scarring



**Bulging of lower lids
on downgaze**

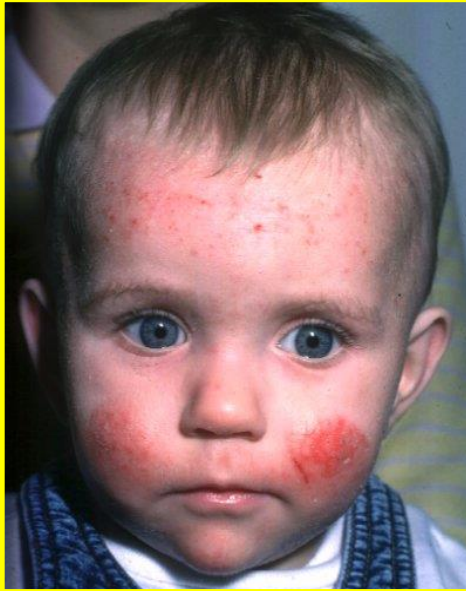


Munson sign



Acute hydrops

Systemic associations of keratoconus



Atopic dermatitis



Down syndrome



Ehlers-Danlos syndrome



Marfan syndrome



Crouzon syndrome



Osteogenesis imperfecta

Keratoconus Treatment

- * Glasses
- * Contact Lenses
- * Crosslinking using Riboflavin and UVA
- * Corneal rings
- * Corneal Graft

CORNEAL SURGERY

1. Penetrating keratoplasty

2. Refractive surgery

- **Radial keratotomy**
- **Photorefractive keratectomy (PRK)**
- **Laser in-situ keratomileusis (LASIK)**

Penetrating Keratoplasty

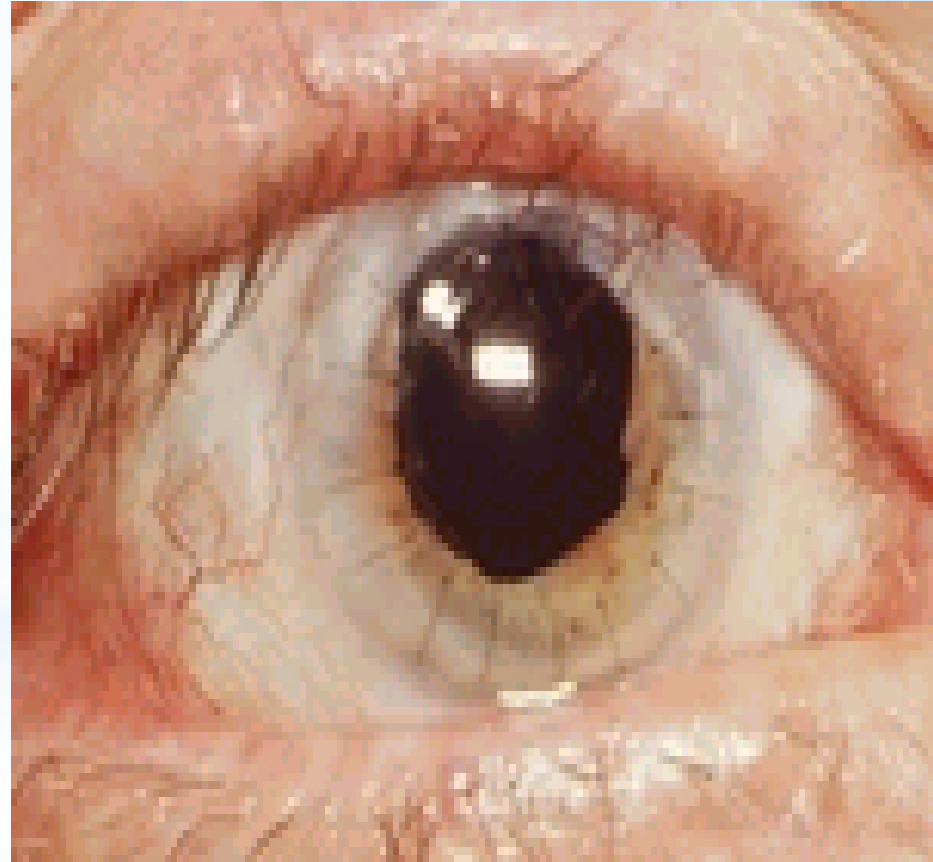
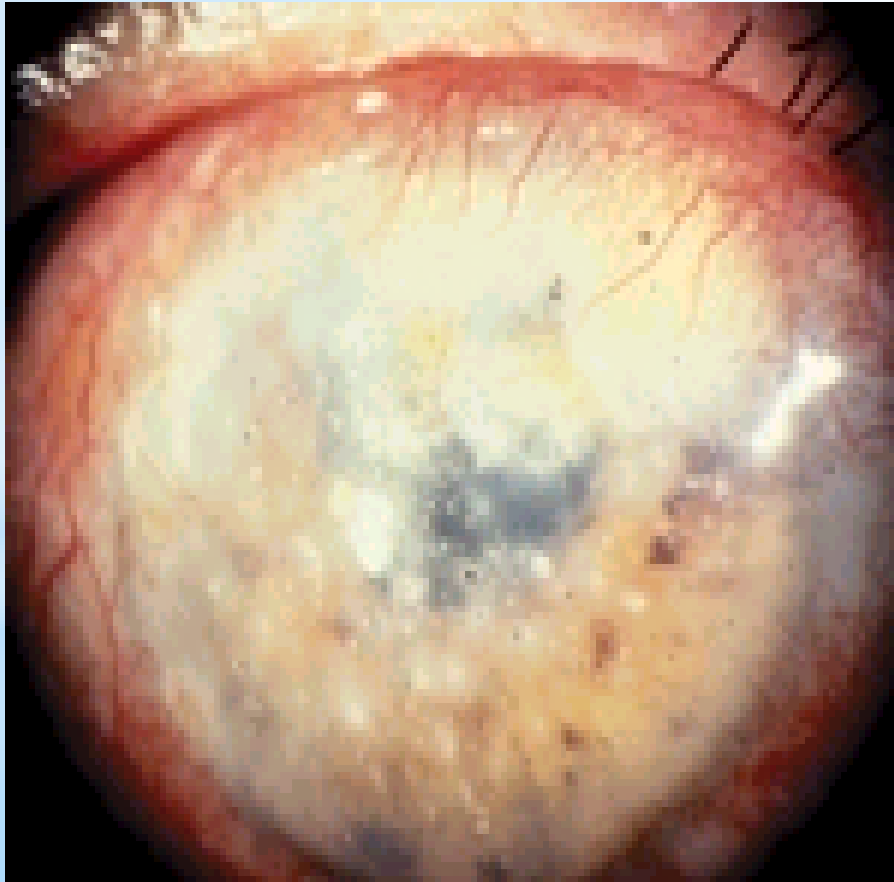
1. Indications

- **Optical (e.g. bullous keratopathy, dystrophies)**
- **Tectonic (e.g. severe stromal thinning, descemetocoele)**
- **Therapeutic (e.g. severe keratitis)**
- **Cosmetic**

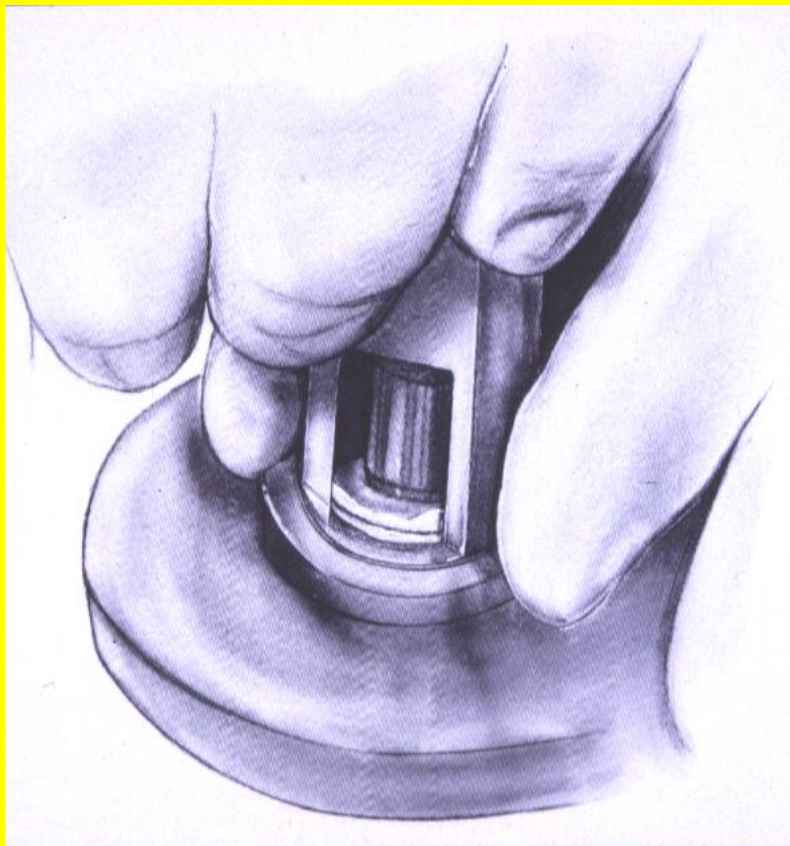
2. Adverse prognostic factors

- **Severe stromal vascularization**
- **Absence of corneal sensation**
- **Progressive conjunctival inflammation (e.g. pemphigoid)**
- **Tear film dysfunction**
- **Glaucoma**

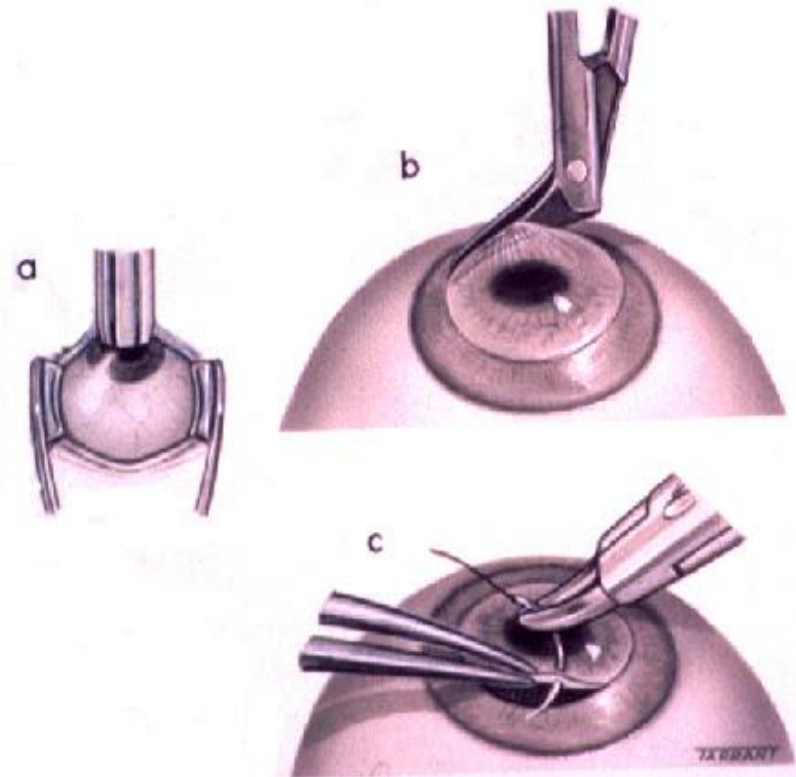
Corneal Graft



Technique of penetrating keratoplasty

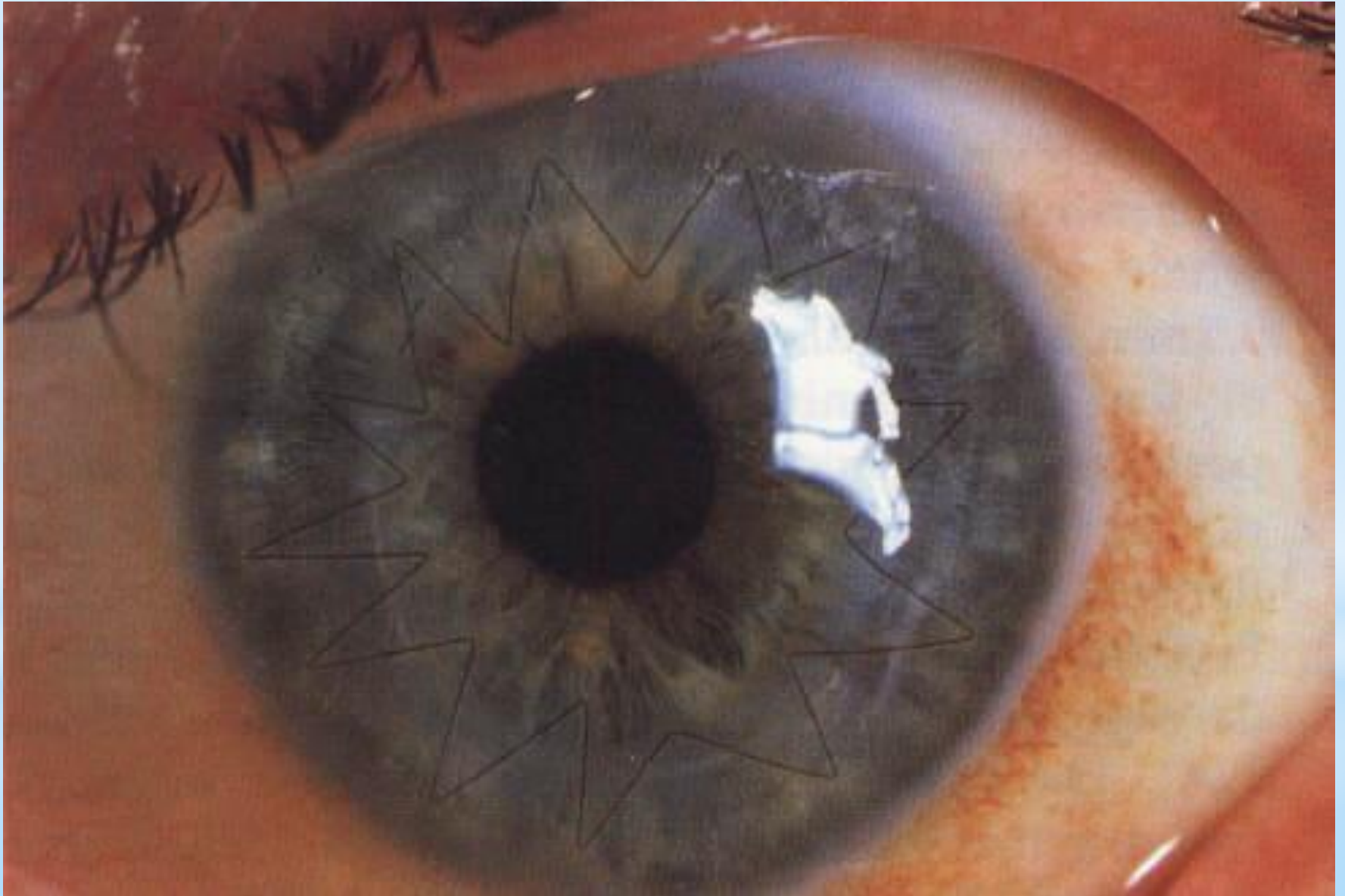


Excision of donor tissue



**a, b - Excision of host tissue
c - Fixation of donor tissue**

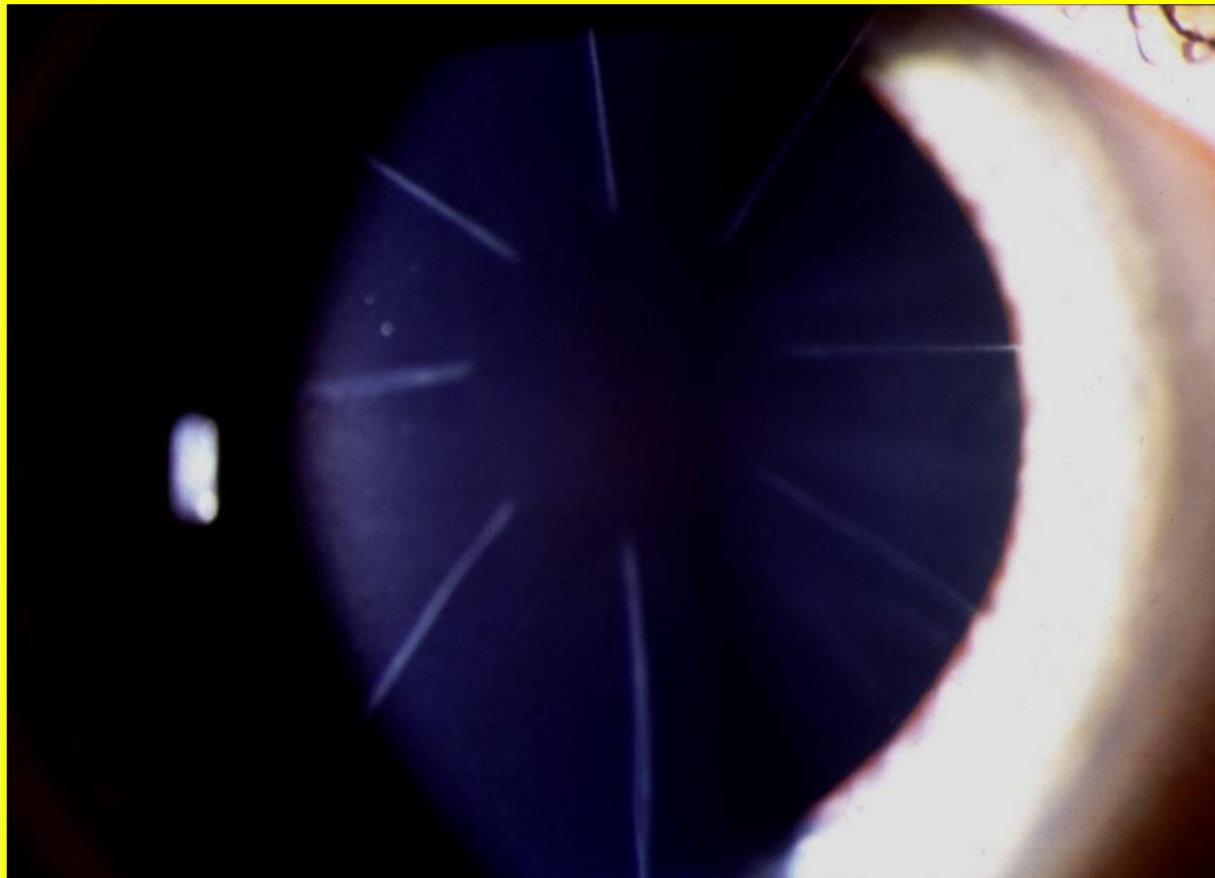
Corneal Graft



Radial keratotomy

Decreases myopia by flattening cornea.

Deep incisions from edge of optical zone to limbus.



Main indications

- Stable myopia of up to 8D
- Otherwise normal cornea

Main complications

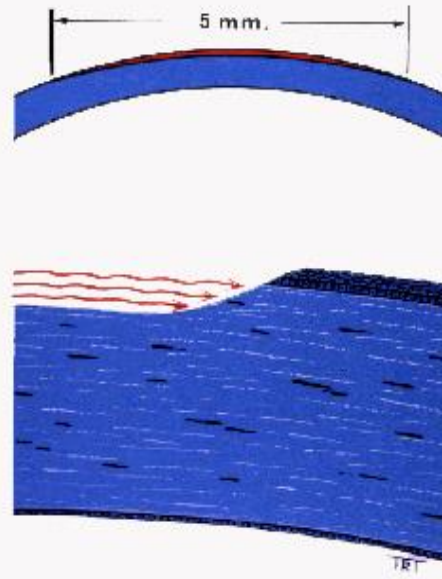
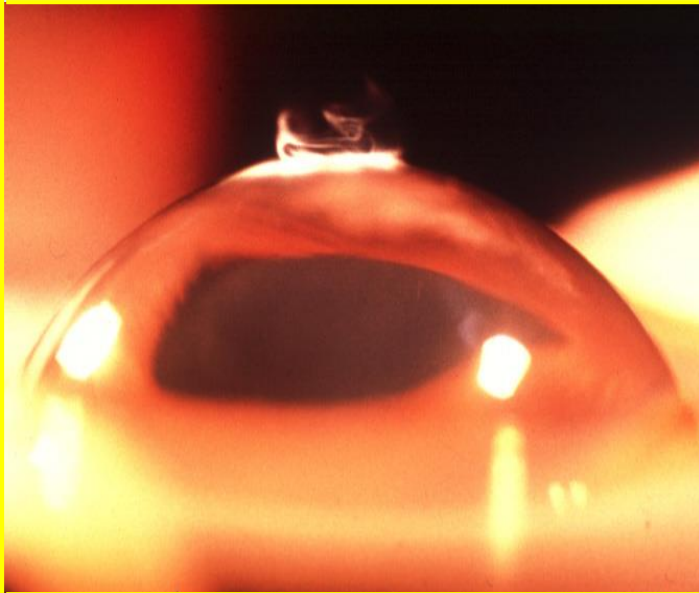
- Accidental perforation
- Intrastromal epithelial cysts

Photorefractive keratectomy (PRK)

Indications

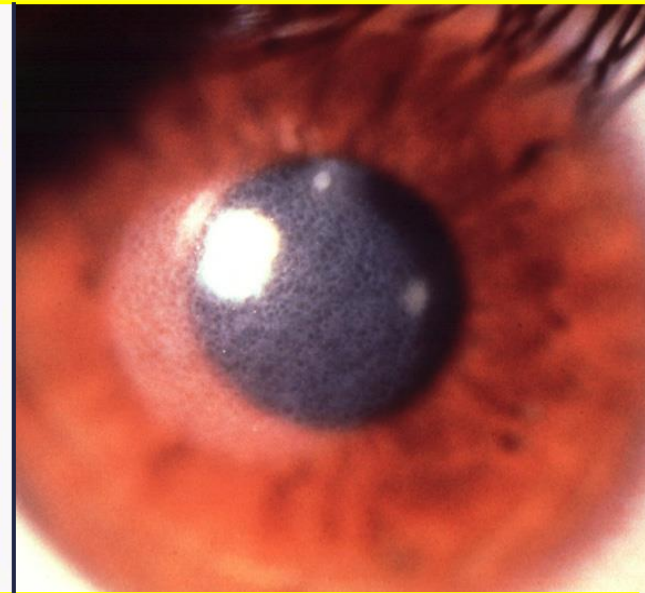
- Stable myopia up to 6D with astigmatism no more than 3D
- Hypermetropia up to 2.5D

Technique



Reshaping of cornea by excimer laser ablation of Bowman layer and anterior stroma

Main complication

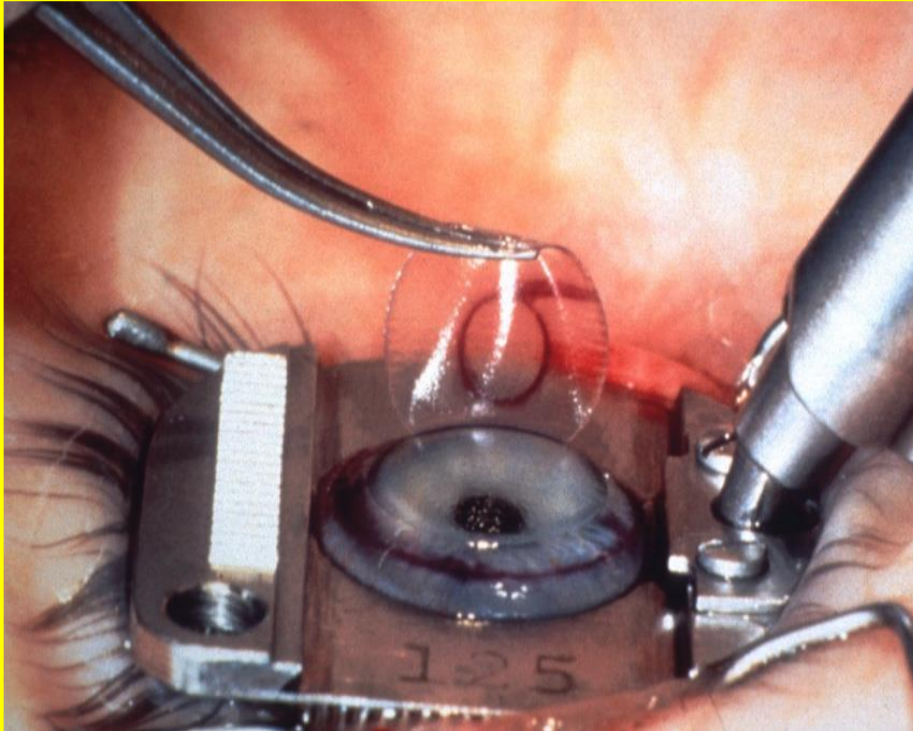


Subepithelial haze which usually resolves after 1-6 months

Laser *in-situ* keratomileusis (LASIK)

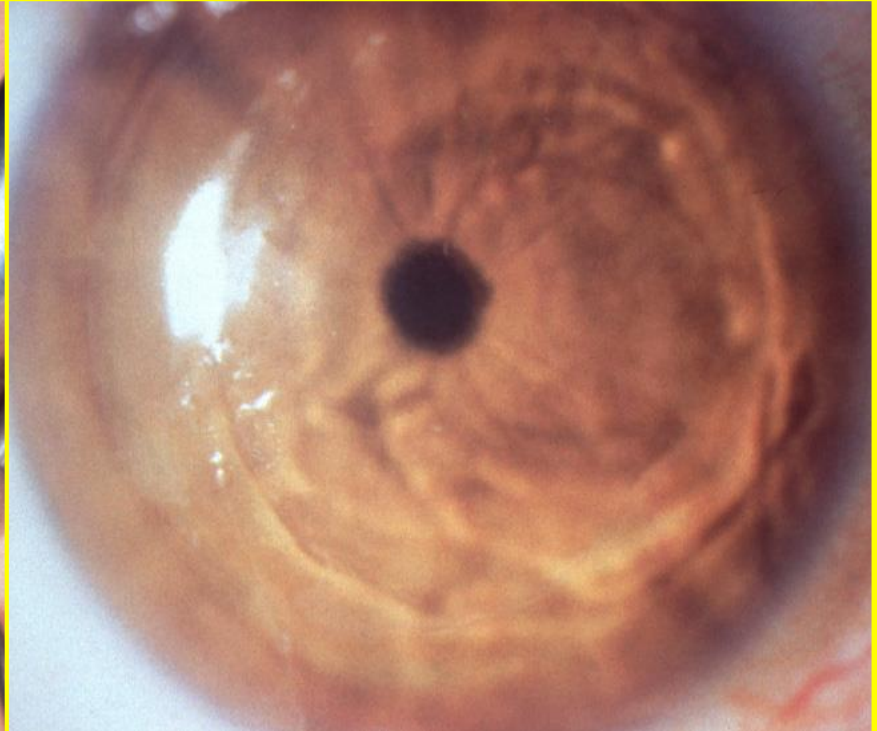
Indications - similar to PRK but corrects higher degrees of myopia

Technique



- Thin flap of cornea fashioned
- Bed treated with excimer laser
- Flap repositioned

Complications



- Wrinkles in flap
- Cellular interface proliferation

SCLERA

EPISCLERITIS AND SCLERITIS

1. Episcleritis

- Simple
- Nodular

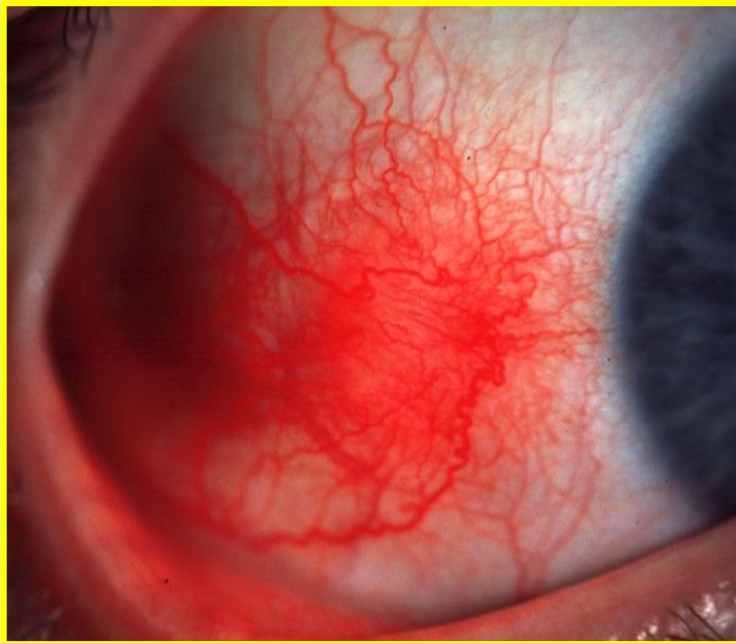
2. Anterior scleritis

- Non-necrotizing diffuse
- Non-necrotizing nodular
- Necrotizing with inflammation
- Necrotizing without inflammation
(scleromalacia perforans)

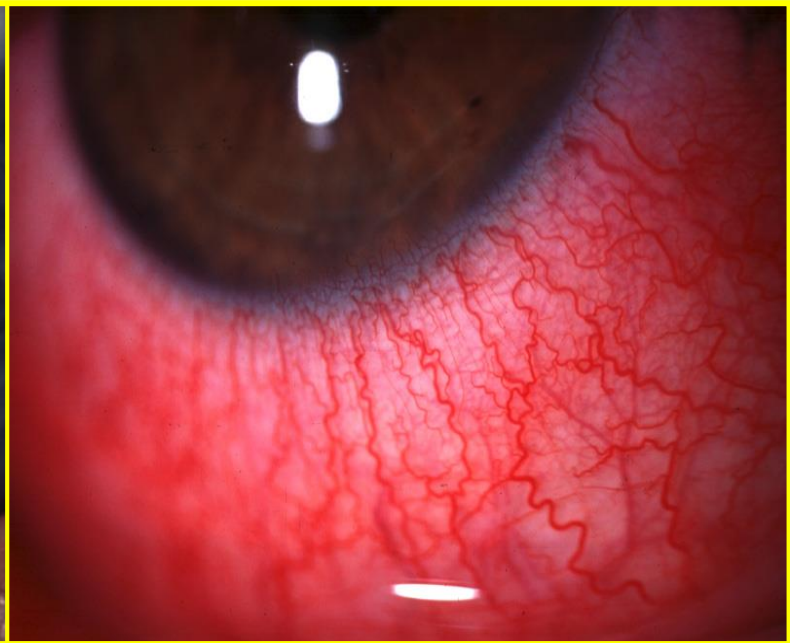
3. Posterior scleritis

Simple episcleritis

- Common, benign, self-limiting but frequently recurrent
- Typically affects young adults
- Seldom associated with a systemic disorder



Simple sectorial episcleritis



Simple diffuse episcleritis

Treatment

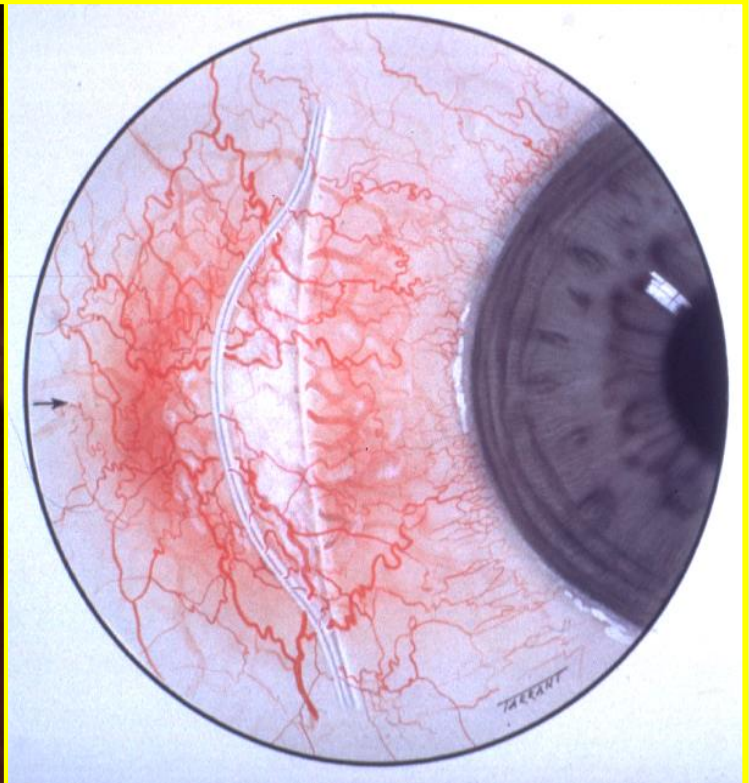
- Topical steroids
- Systemic flurbiprofen (00 mg tid if unresponsive

Nodular episcleritis

- Less common than simple episcleritis
- May take longer to resolve
- Treatment - similar to simple episcleritis



Localized nodule which can be moved over sclera



Deep scleral part of slit-beam not displaced

Causes and Systemic Associations of Scleritis

1. Rheumatoid arthritis

2. Connective tissue disorders

- **Wegener granulomatosis**
- **Polyteritis nodosa**
- **Systemic lupus erythematosus**

3. Miscellaneous

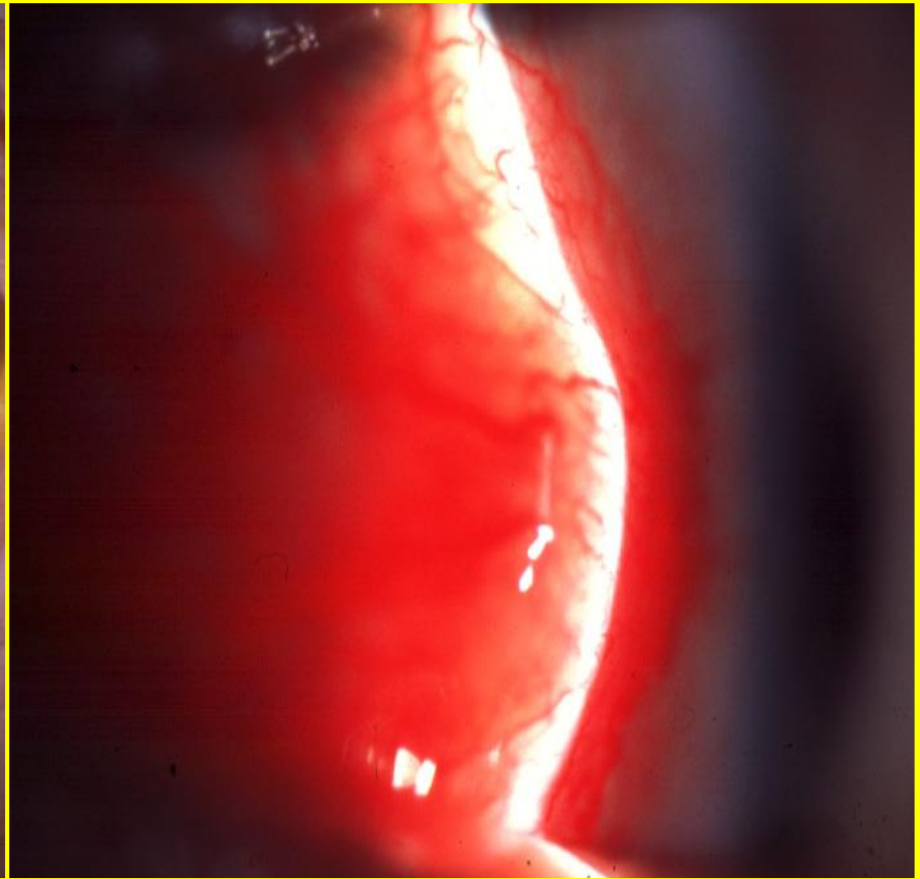
- **Relapsing polychondritis**
- **Herpes zoster ophthalmicus**
- **Surgically induced**

Nodular anterior non-necrotizing scleritis

More serious than diffuse scleritis



On cursory examination resembles nodular episcleritis



Scleral nodule cannot be moved over underlying tissue

Treatment - similar to diffuse non-necrotizing scleritis

CRYSTALLINE LENS

ACQUIRED CATARACT

1. Classification of age-related cataract

- Morphological
- According to maturity

2. Other causes of cataracts

- Diabetes
- Myotonic dystrophy
- Atopic dermatitis
- Trauma
- Drugs
- Secondary (complicated)

3. Surgery

- Large incision extracapsular extraction
 - Phacoemulsification

Classification of Age-related Cataract According to Morphology

1. Subcapsular

- Anterior
- Posterior

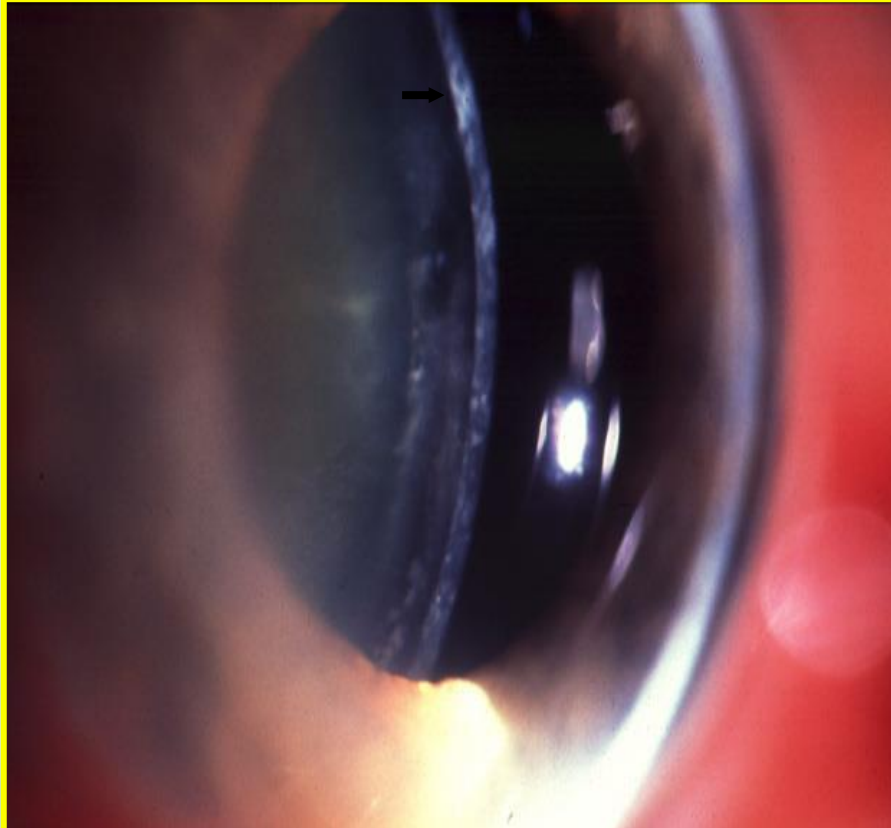
2. Nuclear

3. Cortical

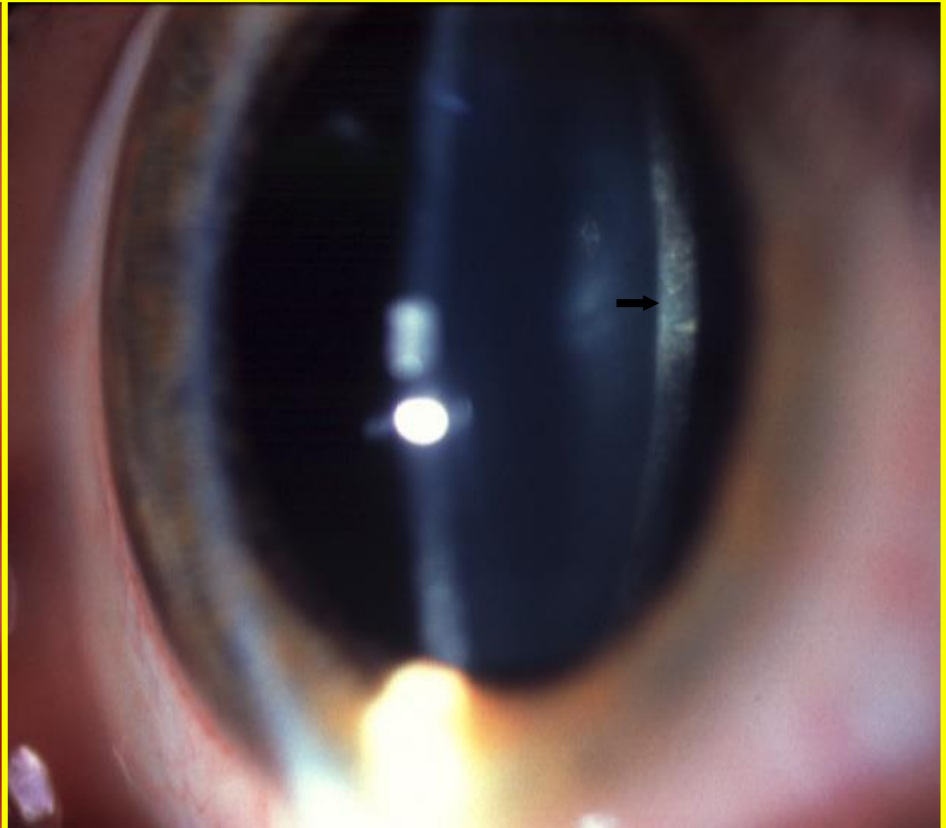
4. Christmas tree

Subcapsular cataract

Anterior

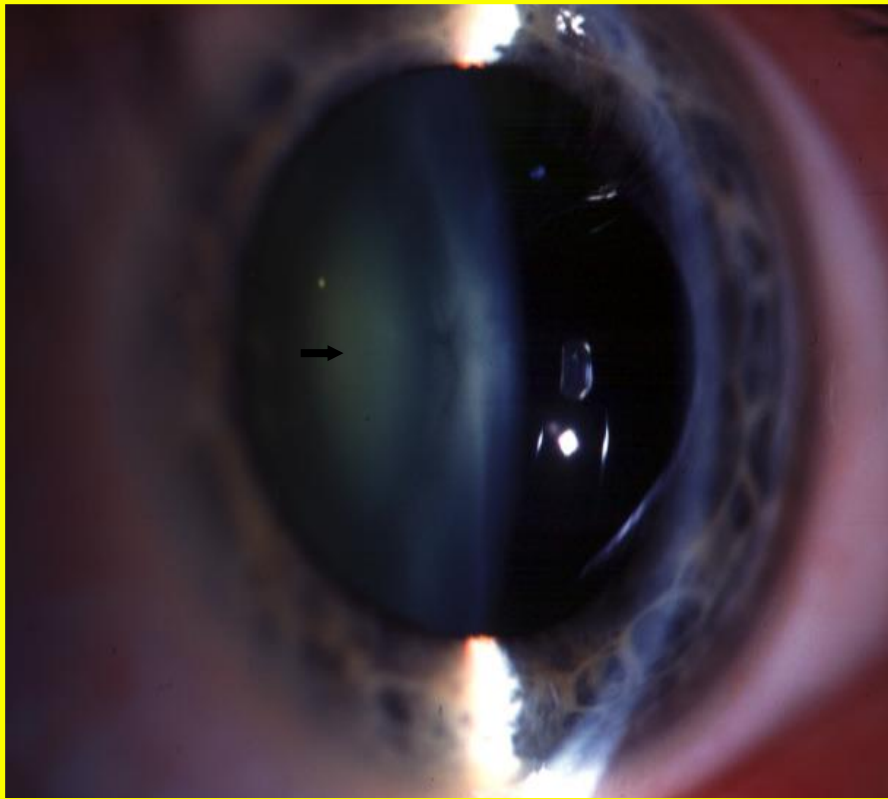


Posterior

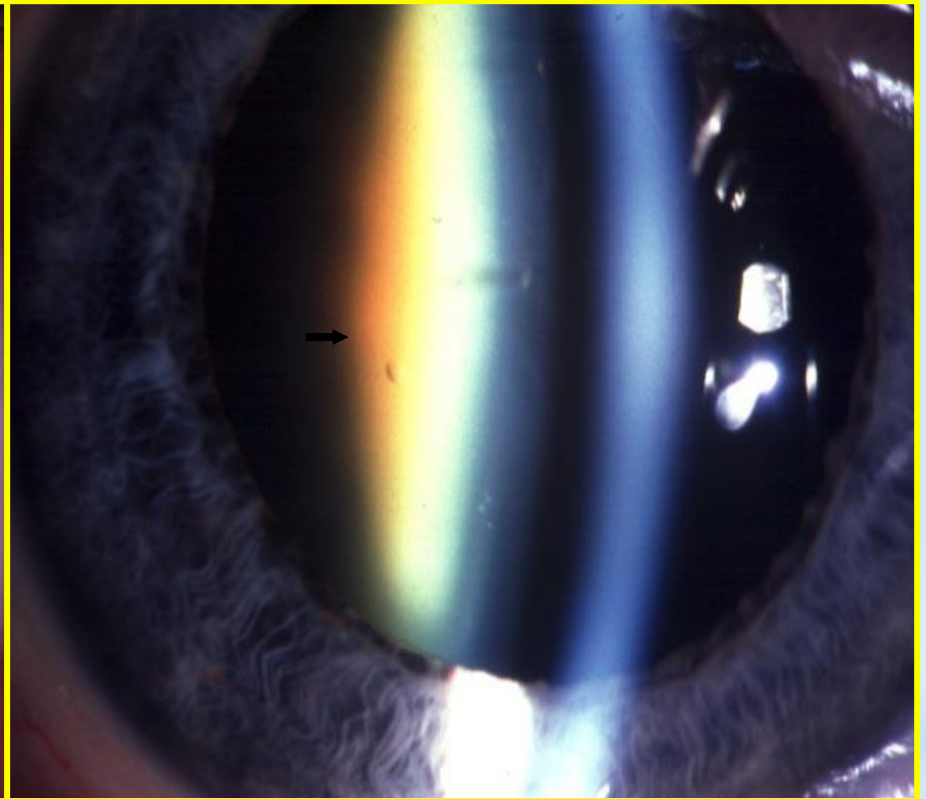


Nuclear cataract

Progression



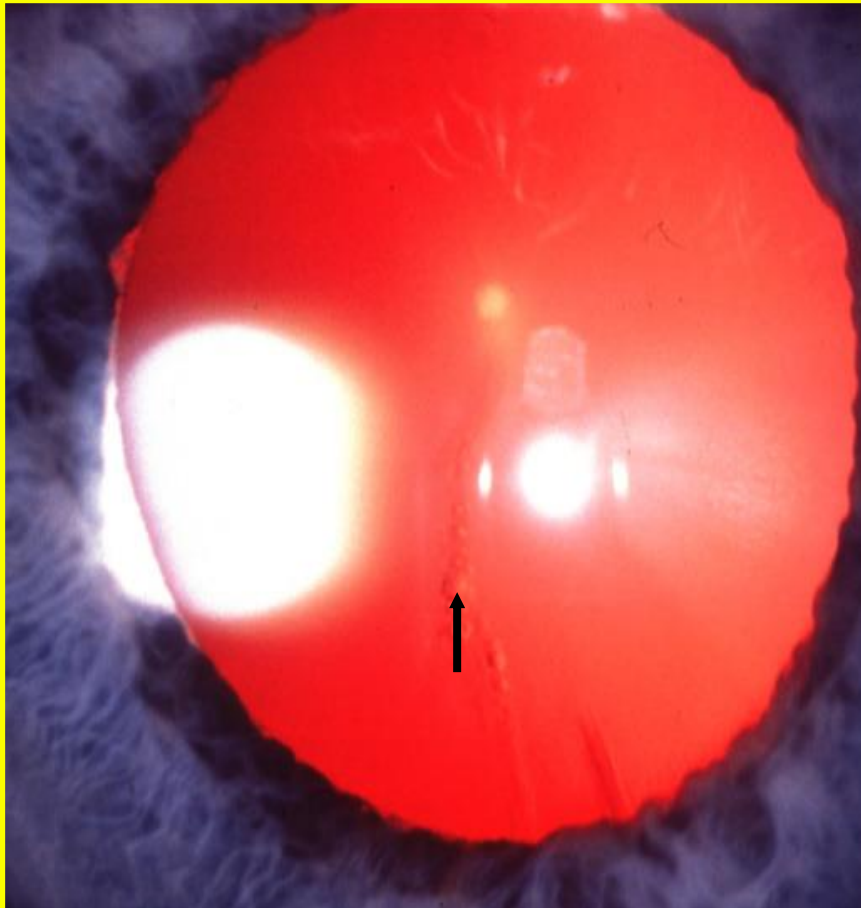
- Exaggeration of normal nuclear ageing change
- Causes increasing myopia



- Increasing nuclear opacification
 - Initially yellow then brown

Cortical cataract

Progression

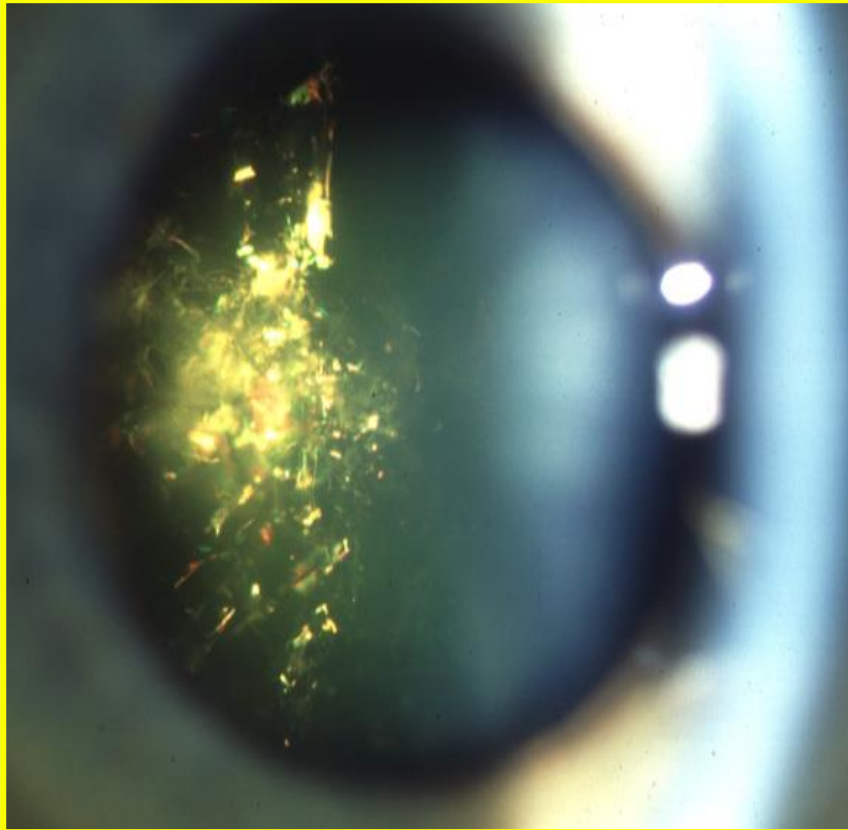


Initially vacuoles and clefts

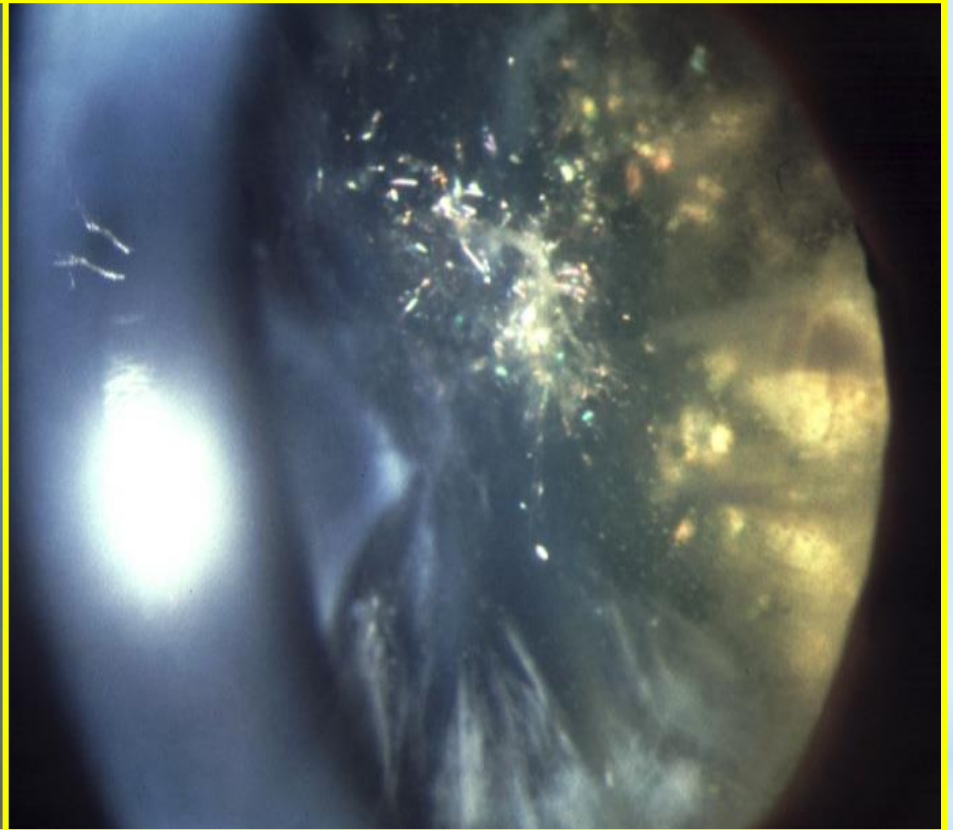


Progressive radial spoke-like opacities

Christmas tree cataract

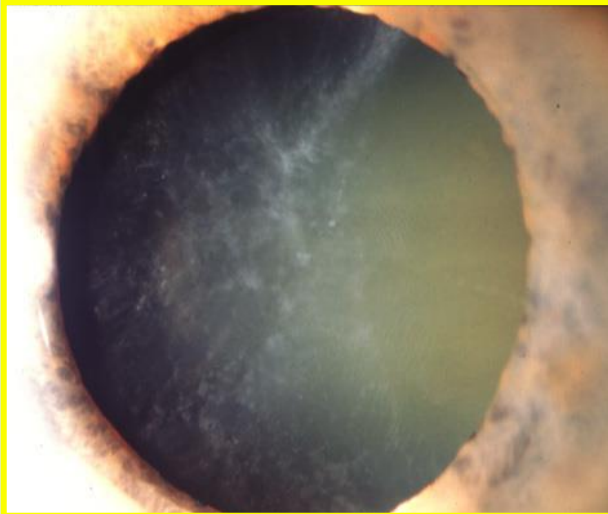


Polychromatic, needle-like opacities

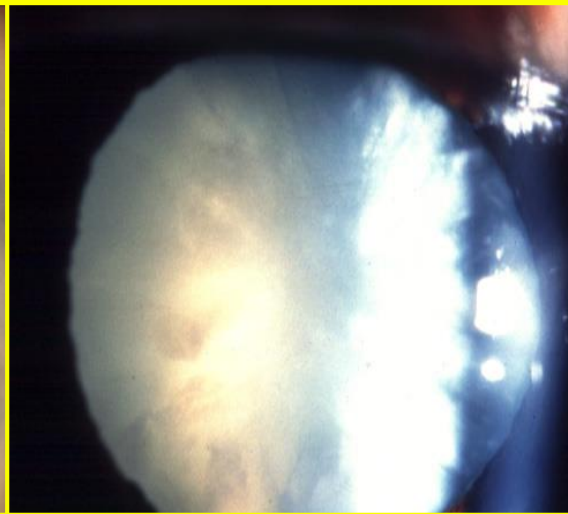


May co-exist with other opacities

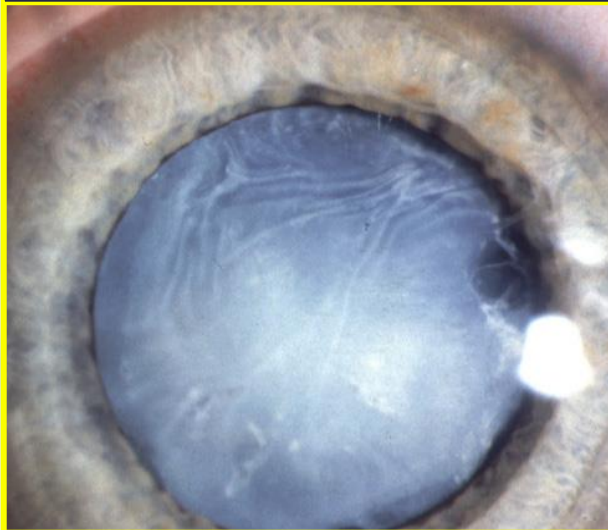
Classification according to maturity



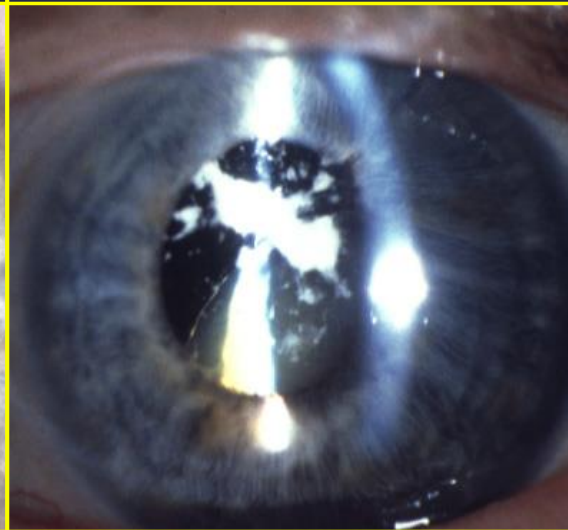
Immature



Mature

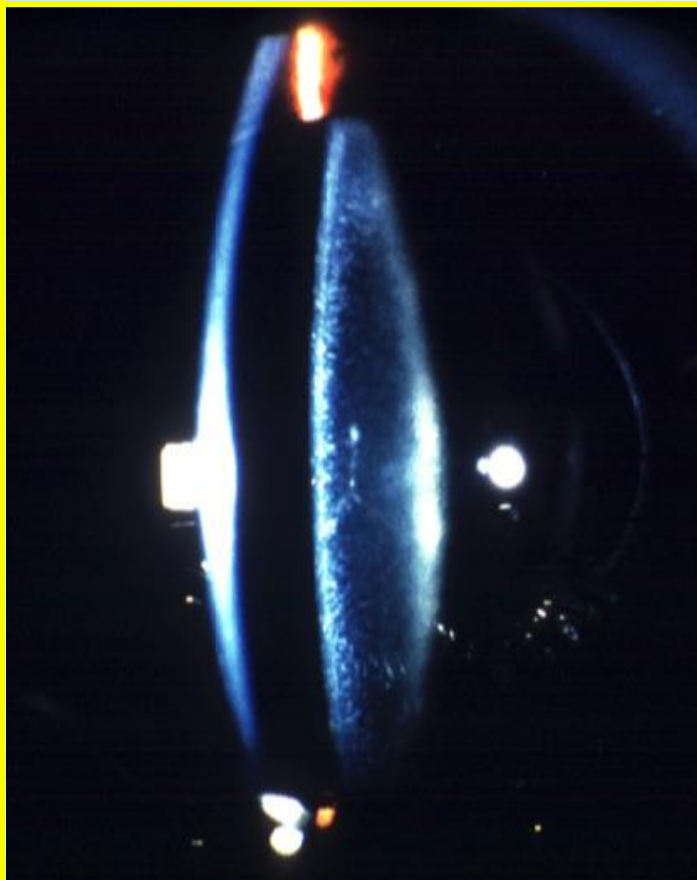


Hypermaturation

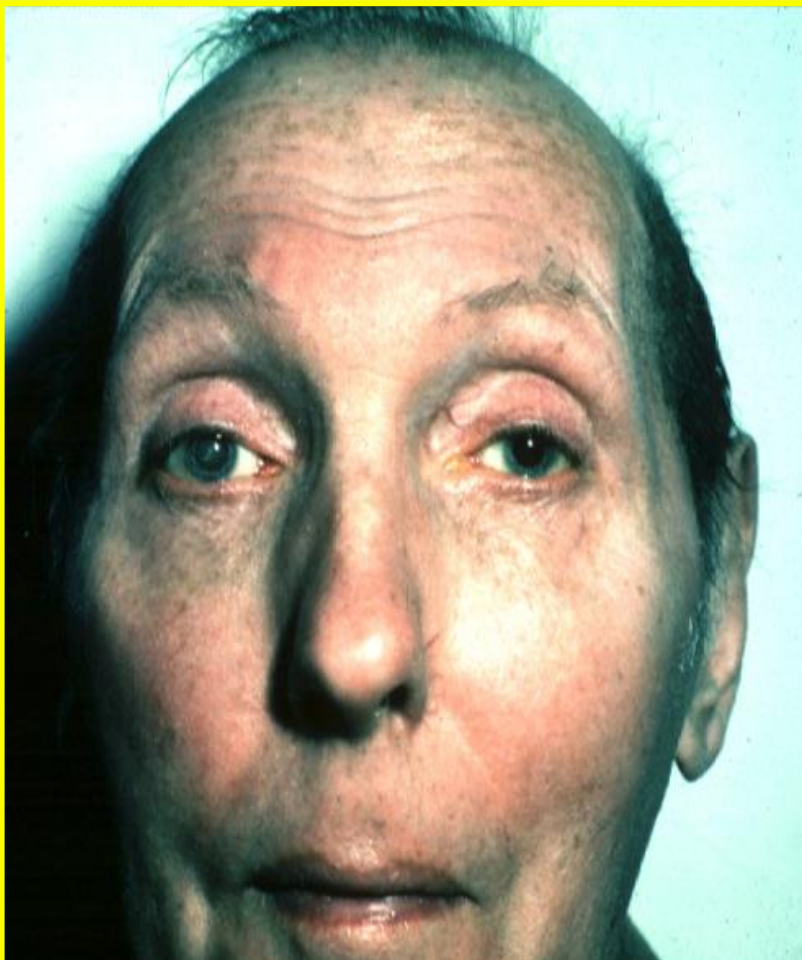


Morgagnian

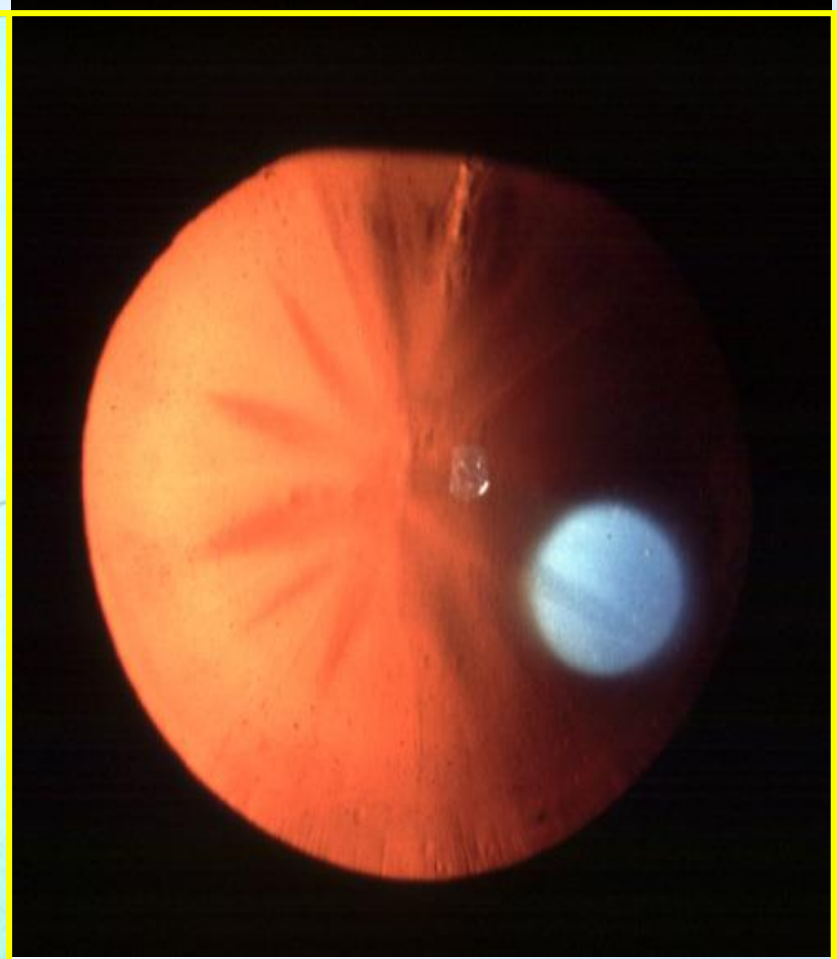
Other causes of cataract - diabetes

Juvenile	Adult
	
• White punctate or snowflake posterior or anterior opacities • May mature within few days	• Cortical and subcapsular opacities • May progress more quickly than in non-diabetics

Other causes of cataract - myotonic dystrophy

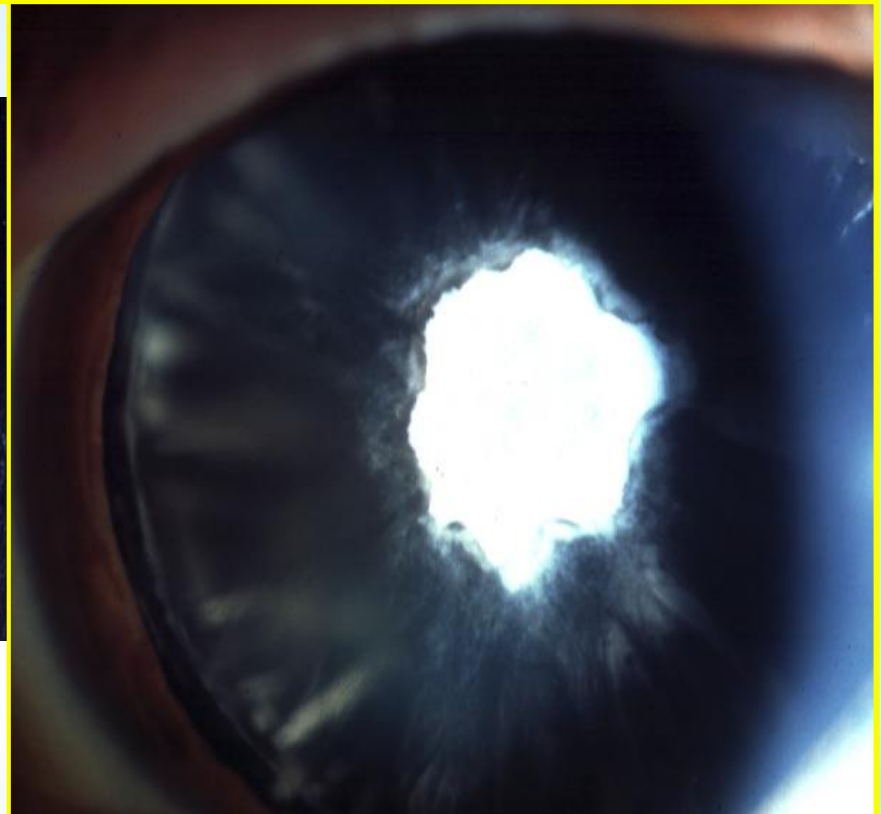


- Myotonic facies
- Frontal balding



- Stellate posterior subcapsular opacity
 - 90% of patients after age 20 years
 - No visual problem until age 40 years

Other causes of cataract - atopic dermatitis

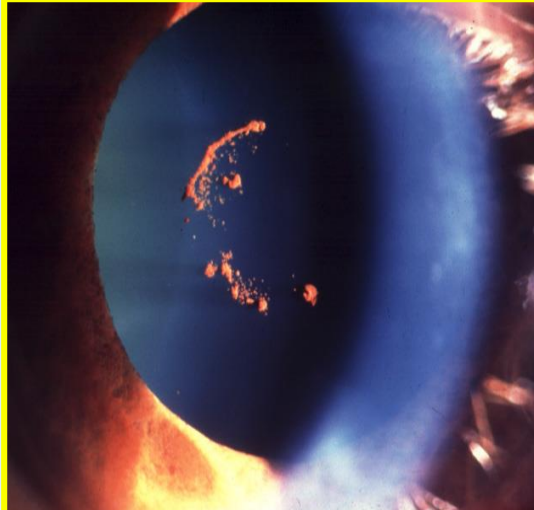


- Cataract develops in 10% of cases between 15-30 years
 - Bilateral in 70%
 - Frequently becomes mature

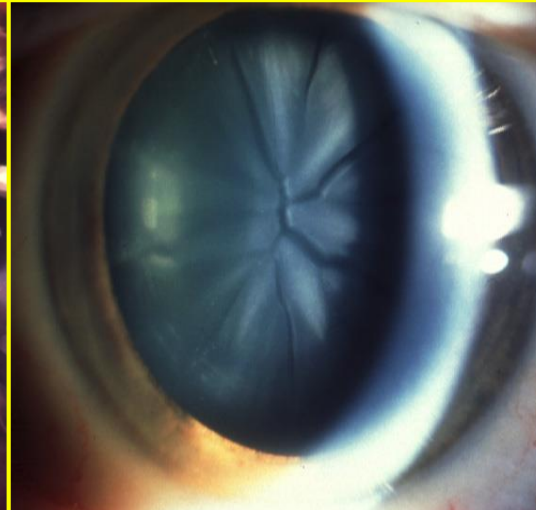
- Anterior subcapsular plaque (shield cataract)
- Wrinkles in anterior capsule

Causes of traumatic cataract

Concussion



'Vossius' ring from imprinting of iris pigment



Flower-shaped

Penetration



Other causes

- Ionizing radiation
- Electric shock
- Lightning

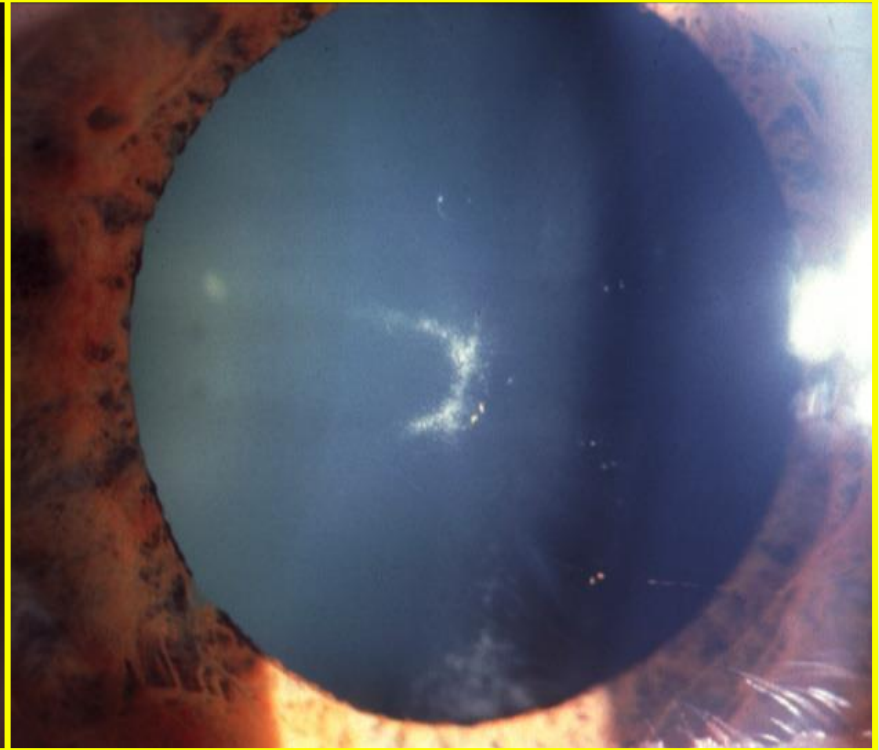
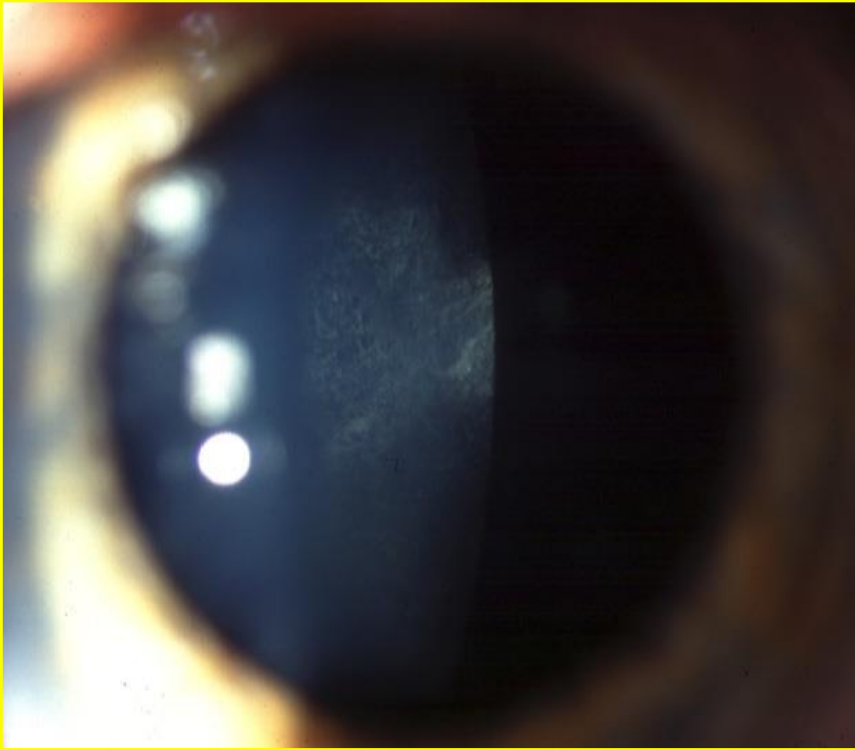
Drugs

Systemic or topical steroids

- initially posterior subcapsular

Chlorpromazine

- central, anterior capsular granules

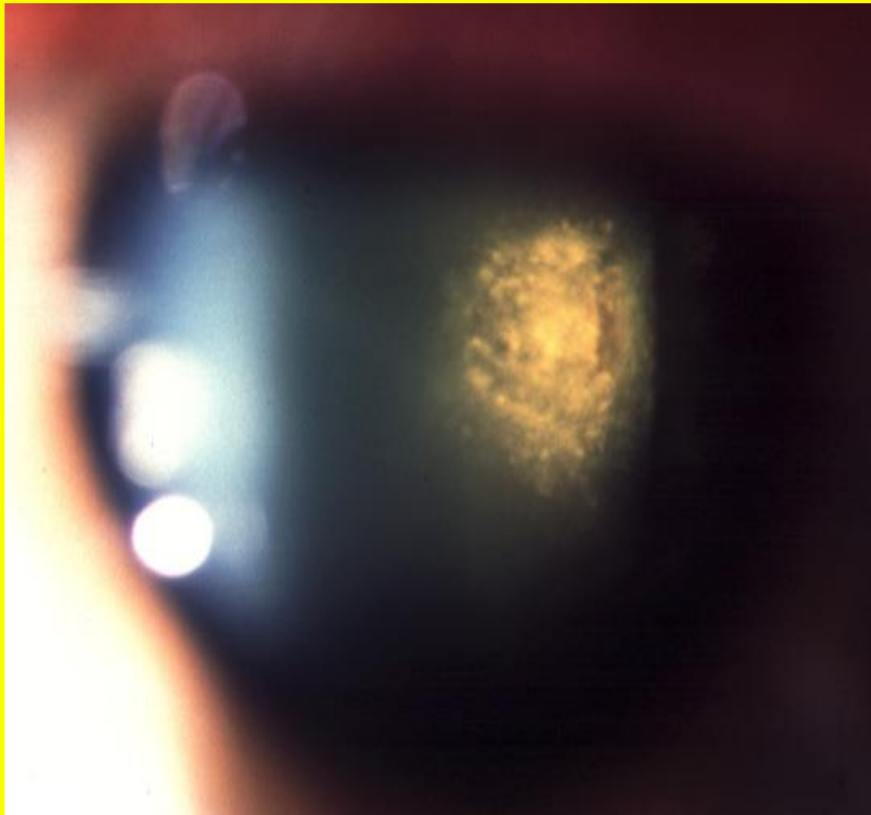


Other drugs

- Long-acting miotics
- Amiodarone
- Busulphan

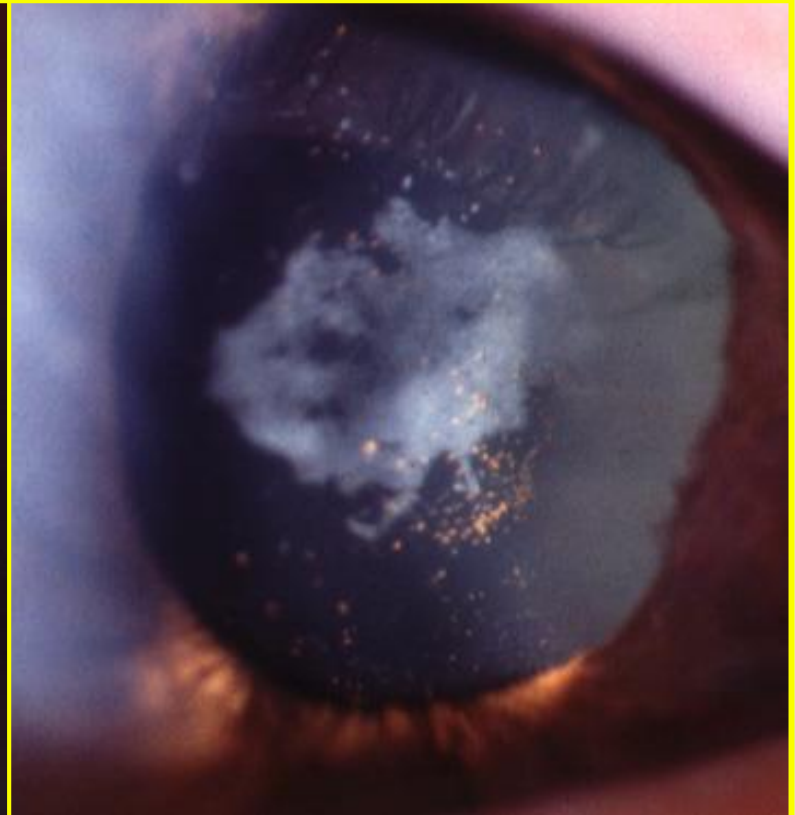
Secondary (complicated) cataract

Posterior subcapsular



Chronic anterior uveitis.
High myopia.
Hereditary fundus dystrophies.

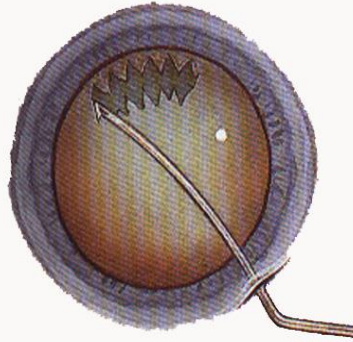
Glaukomflecken



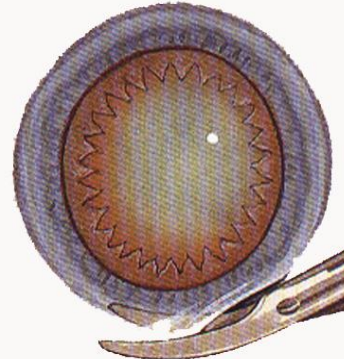
Follows acute angle-closure
glaucoma.
Central, anterior subcapsular
opacities

Extracapsular cataract extraction

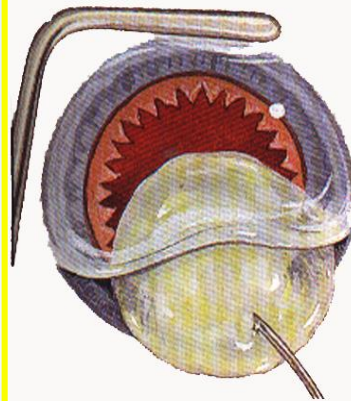
1. Anterior capsulotomy



2. Completion of incision



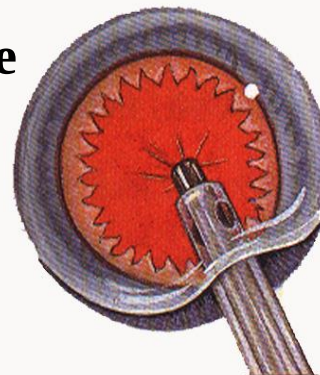
3. Expression of nucleus



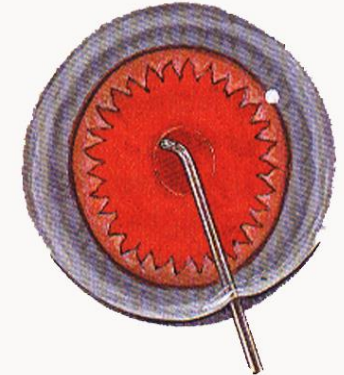
4. Cortical cleanup



5. Care not to aspirate posterior capsule accidentally

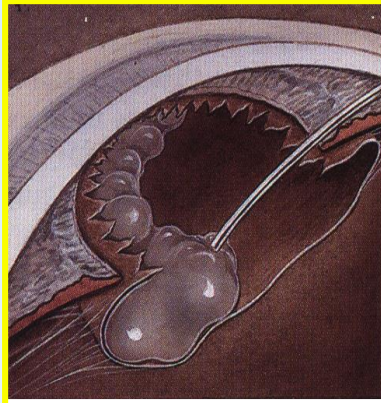


6. Polishing of posterior capsule, if appropriate

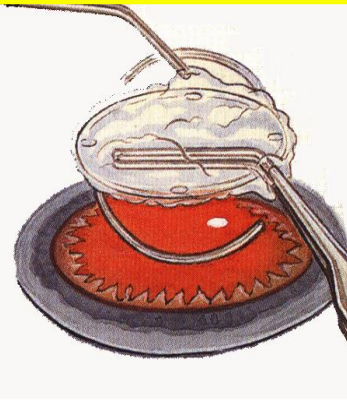


Extracapsular cataract extraction (cont.)

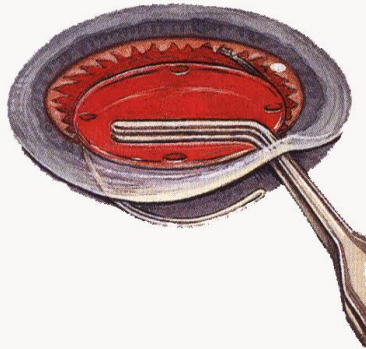
7. Injection of viscoelastic substance



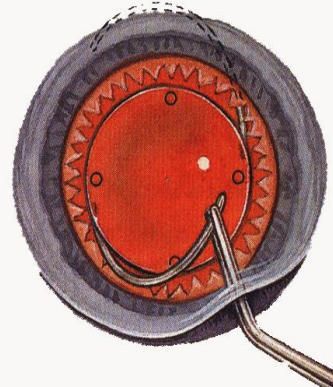
8. Grasping of IOL And coating with Viscoelastic substance



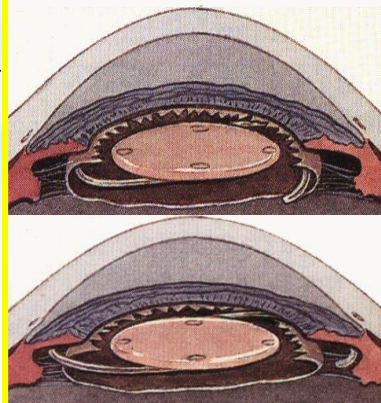
9. Insertion of inferior haptic and optic



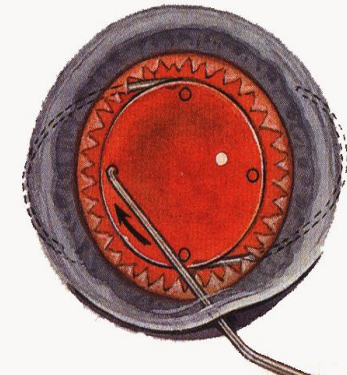
10. Insertion of superior haptic



11. Placement of haptic into capsular bag and not into Ciliary sulcus



12. Dialling of IOL into horizontal position

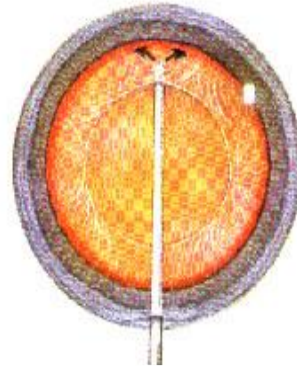


Phacoemulsification

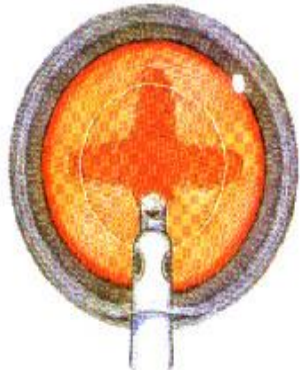
1. Capsulorrhexis



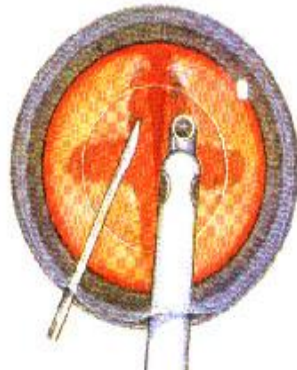
2. Hydrodissection



3. Sculpting of nucleus



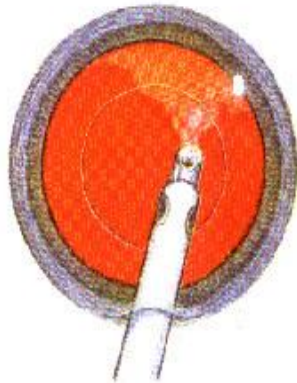
4. Cracking of nucleus



5. Emulsification of each quadrant



6. Cortical cleanup and insertion of IOL

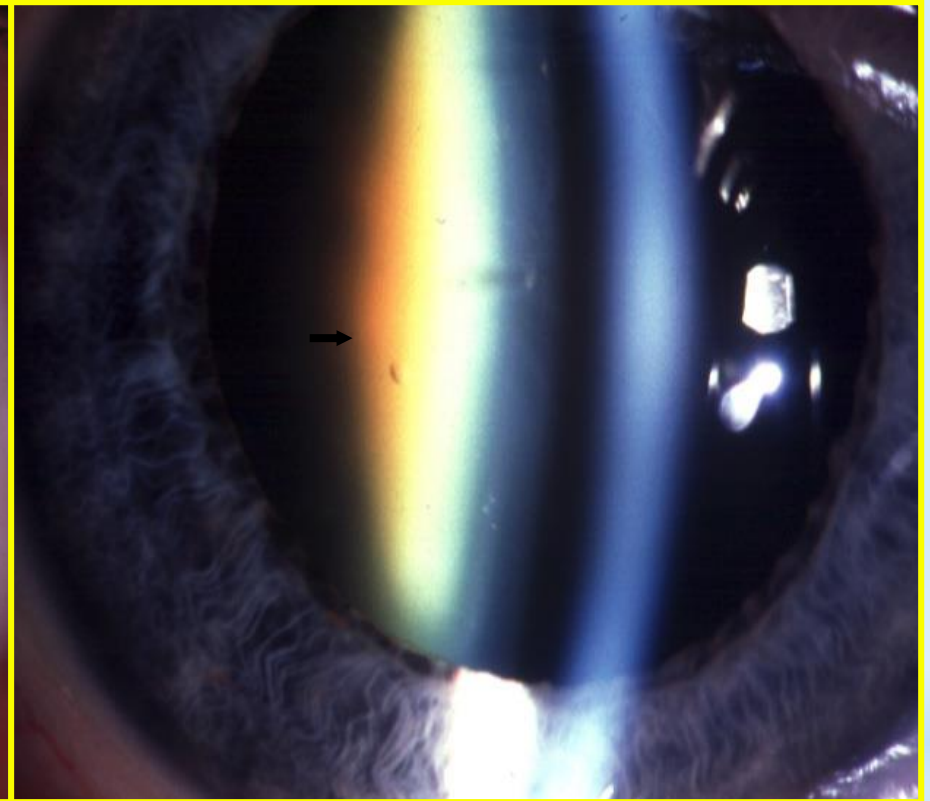
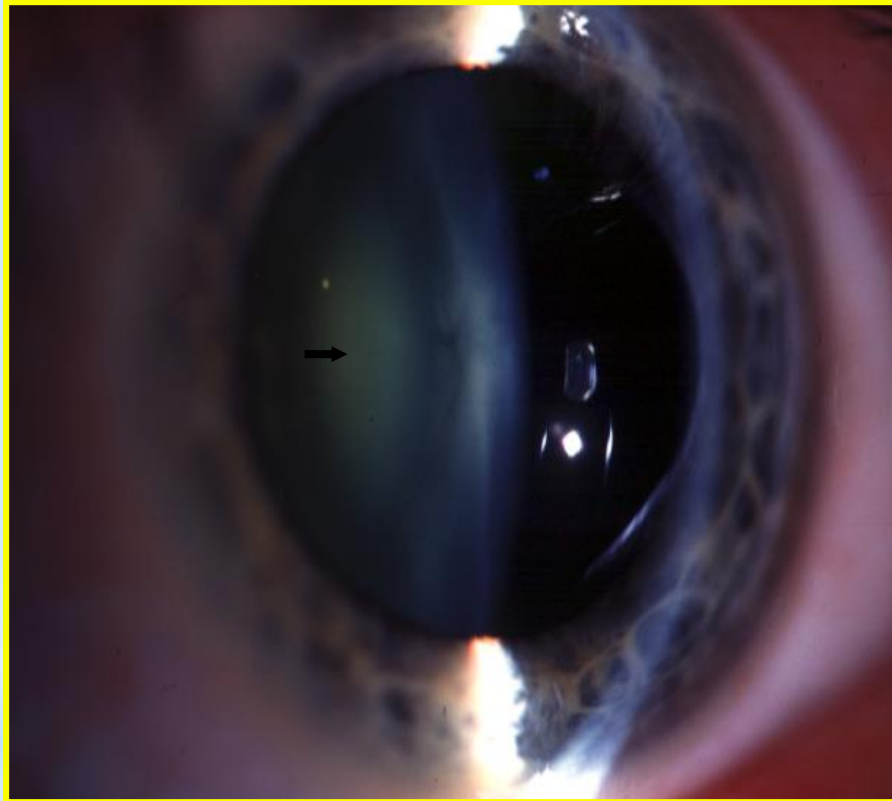


Congenital Cataract



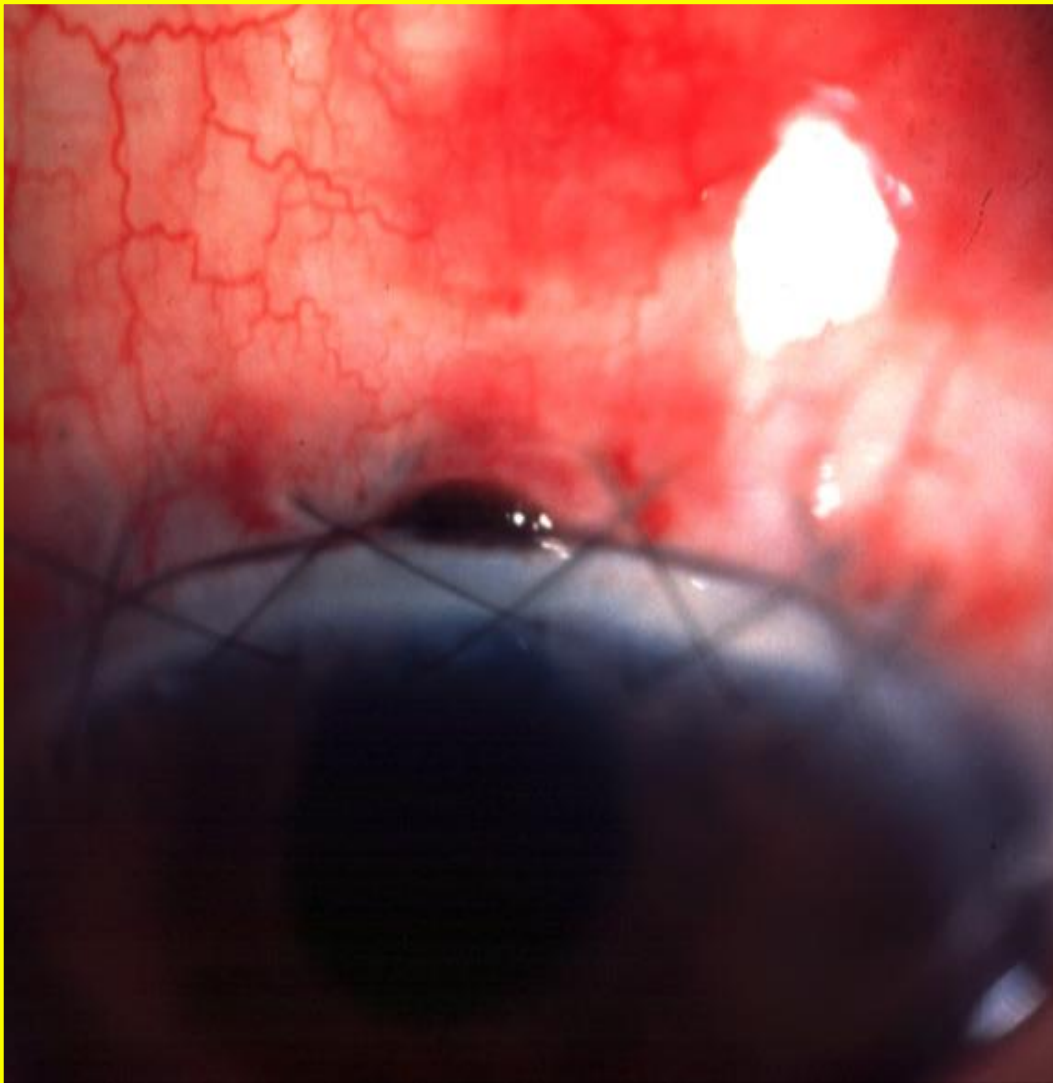
- **33% - idiopathic - may be unilateral or bilateral**
- **33% - inherited - usually bilateral**
- **33% - associated with systemic disease - usually bilateral**
- **Other ocular anomalies present in 50%**

Senile Cataract



Early postoperative complications

Iris prolapse



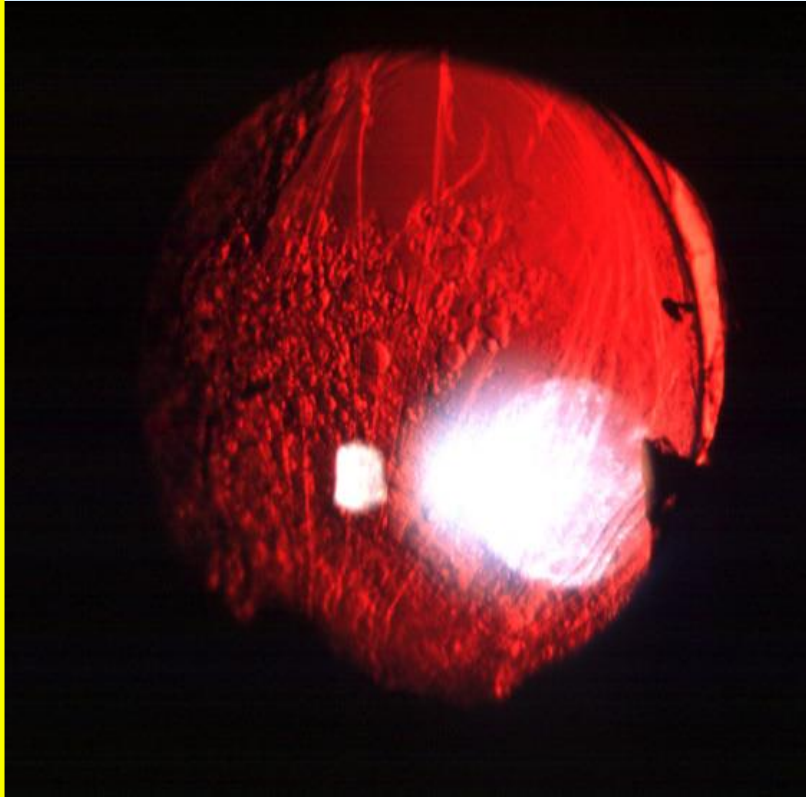
Cause

- Usually inadequate suturing of incision
- Most frequently follows inappropriate management of vitreous loss

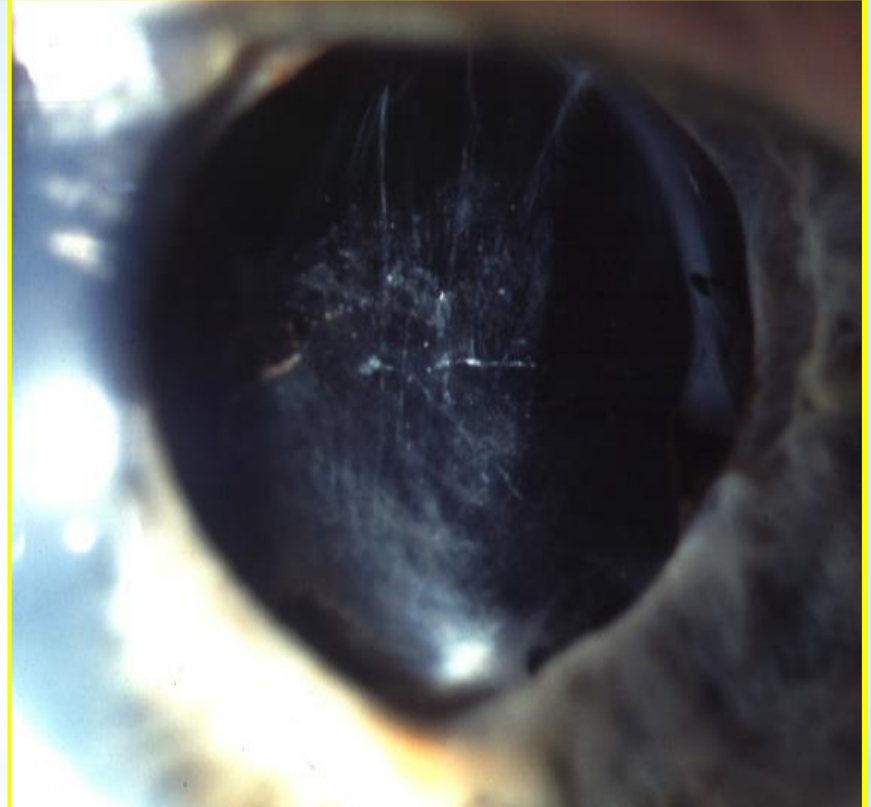
Treatment

- Excise prolapsed iris tissue
- Resuture incision

Capsular Opacification



- Proliferation of lens epithelium
- Occurs after 3-5 years



Acute bacterial endophthalmitis

Incidence - about 1:1,000



Common causative organisms

- *Staph. epidermidis*
- *Staph. aureus*
- *Pseudomonas* sp.

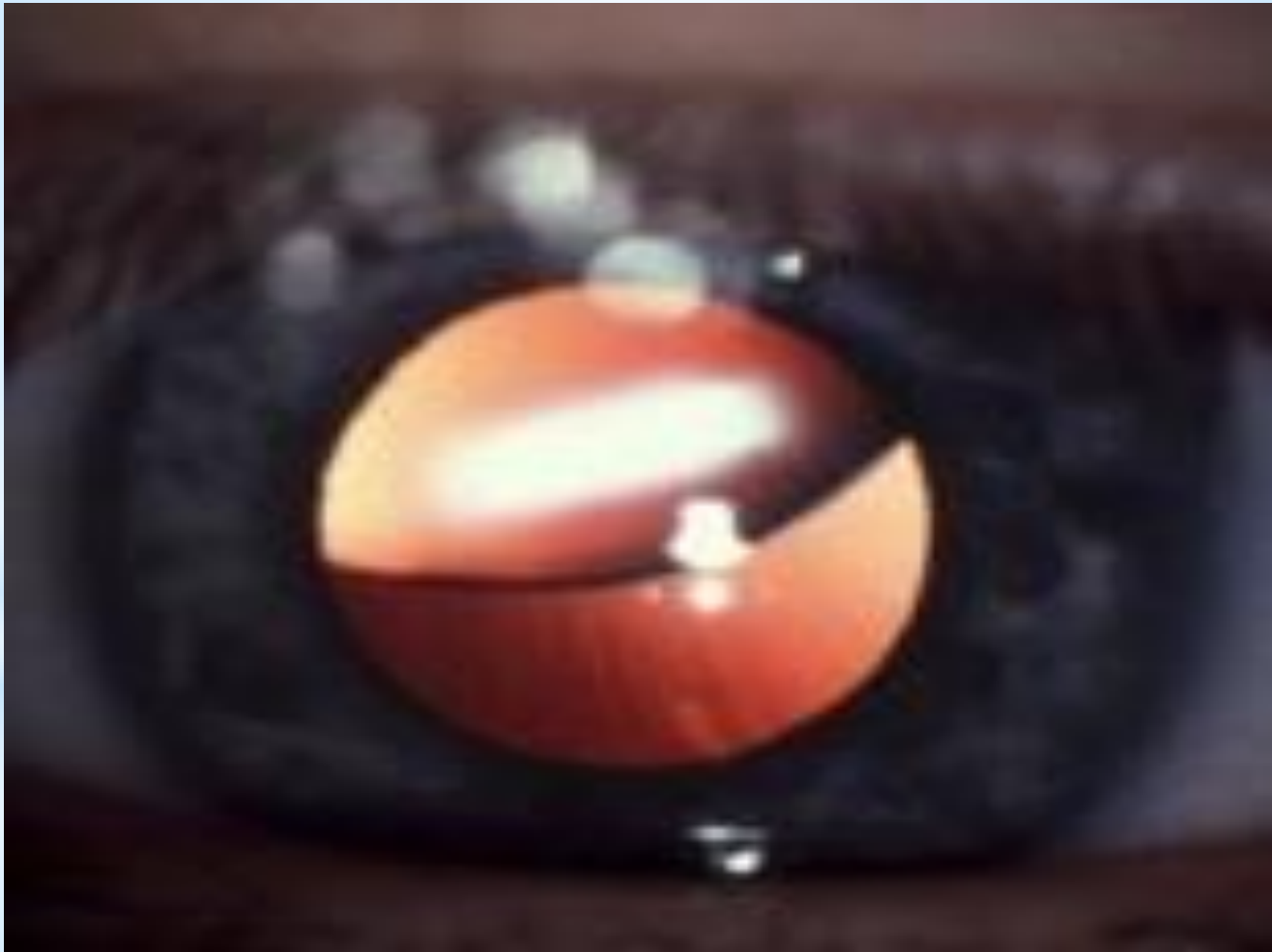
Source of infection

- Patient's own external bacterial flora is most frequent culprit
- Contaminated solutions and instruments
- Environmental flora including that of surgeon and operating room personnel

ECTOPIA LENTIS

1. Acquired
2. Isolated familial ectopia lentis
3. Associated with systemic syndromes
 - Marfan syndrome
 - Weill-Marchesani syndrome
 - Homocystinuria
4. Treatment options

Subluxated Lens (Ectopia Lentis)



Uveal Tract

Uveal Tract

* Is the intermediate coat of the eyeball

* Consists of :

Iris

Ciliary Body

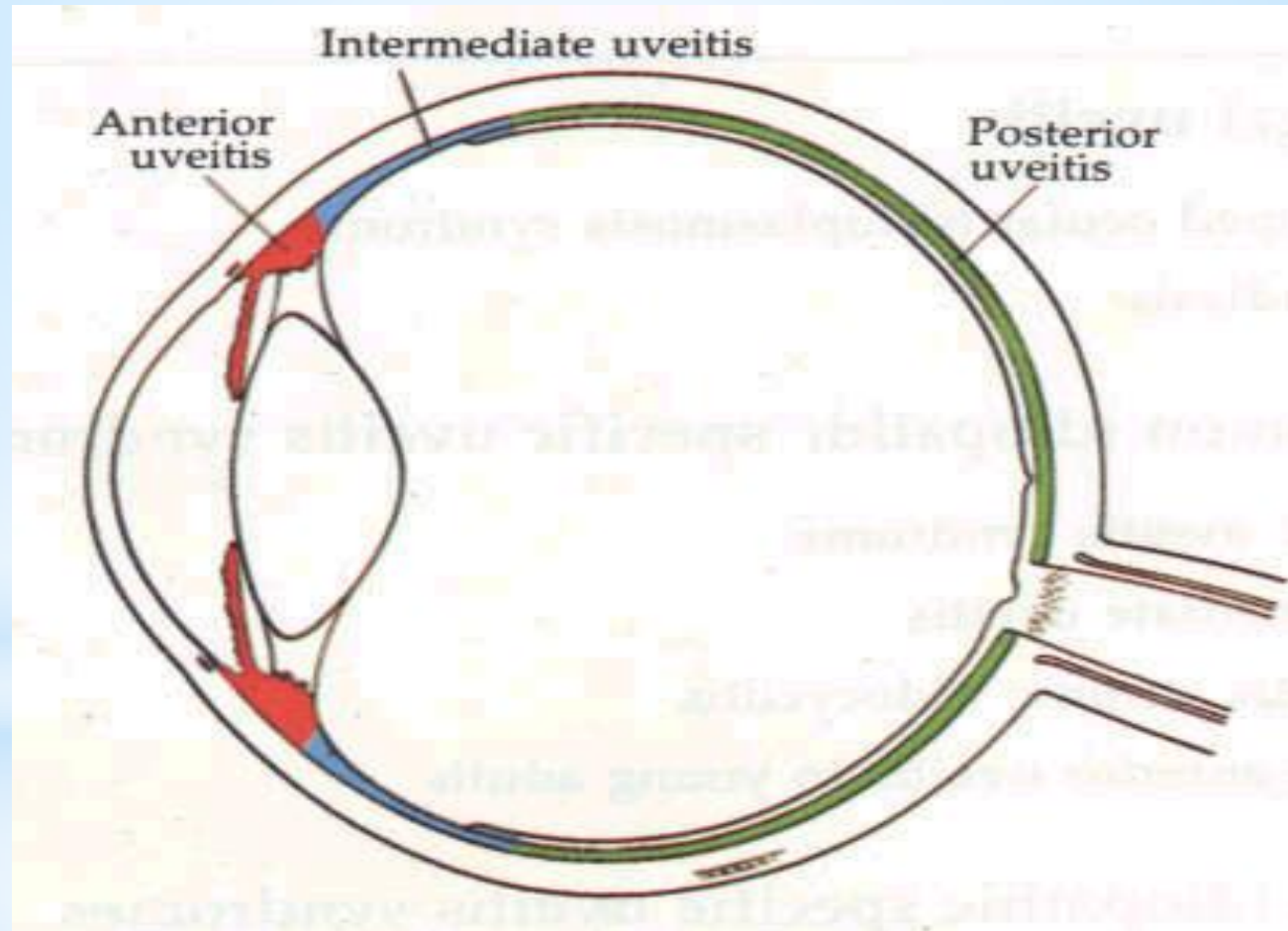
Choroid

Anterior Uvea

Posterior

Uvea

Anatomical classification of uveitis



Inflammations of the Iris and Ciliary Body (Anterior uveitis)

* Aetiology

* Secondary Irido-cyclitis

- * Corneal ulcer

Retinal detachment

- * Scleritis

Intra-ocular FB

- * Intra-ocular tumor

Lens-induced

* Primary Irido-cyclitis

- * Exogenous

- * Endogenous

Symptoms

- * Pain
- * Photophobia
- * Lacrimation
- * Decreased vision
 - * Haziness of Aqueous and vitreous
 - * Oedema of cornea
 - * Spasm of CB - Myopia
 - * Macular Oedema
 - * Secondary Glaucoma

Signs

*Lids

Edematous

*Conjunctiva

Ciliary injection

*Cornea

KPs

*AC

Aqueous Flare

Aqueous Cells

Hypopyon

Hyphaema

*Iris changes

Muddy

*Pupil
Synechia

Constricted and irregular;

*Ciliary Body

Spasm

*Vitreous

Cloudy

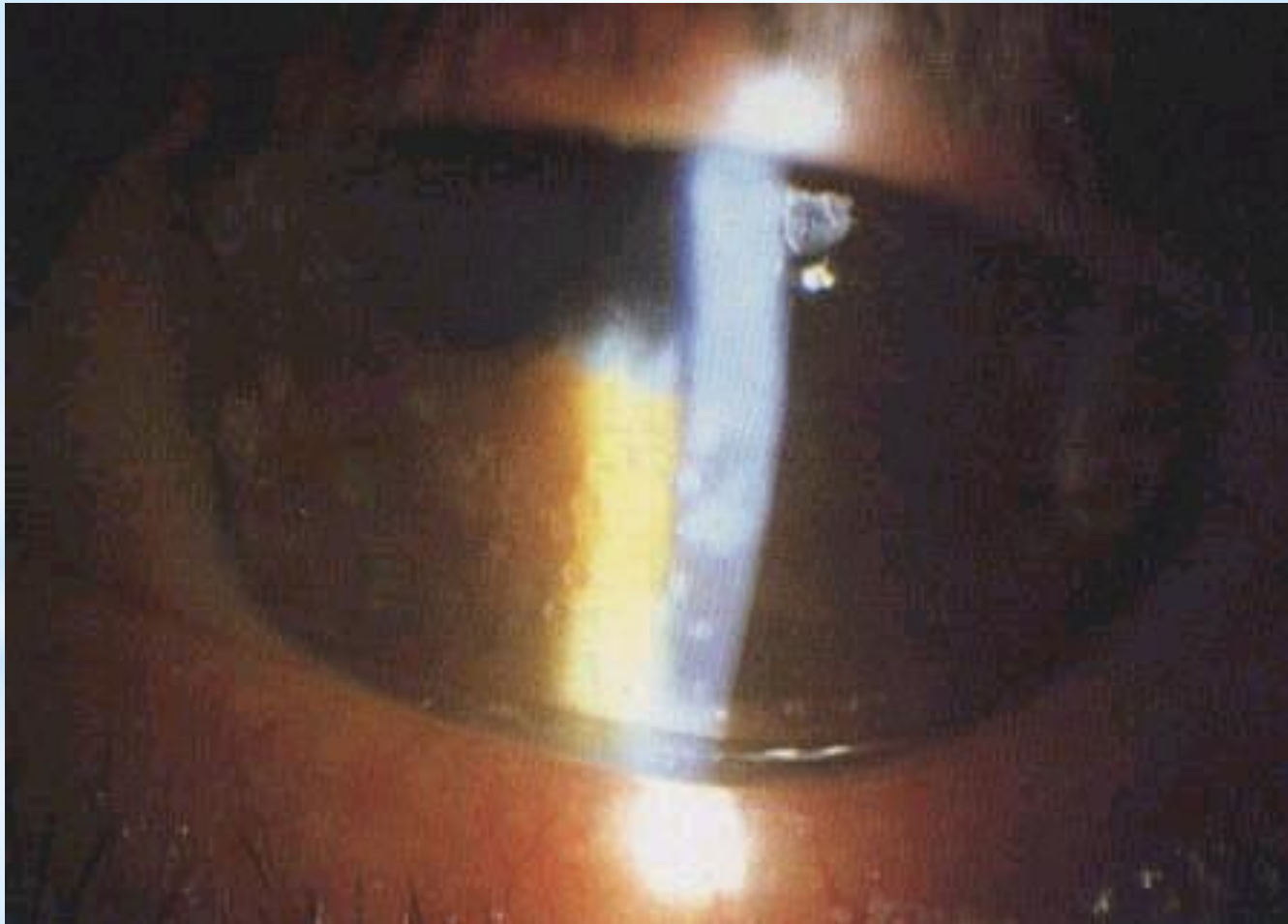
*The tension

Secondary Glaucoma

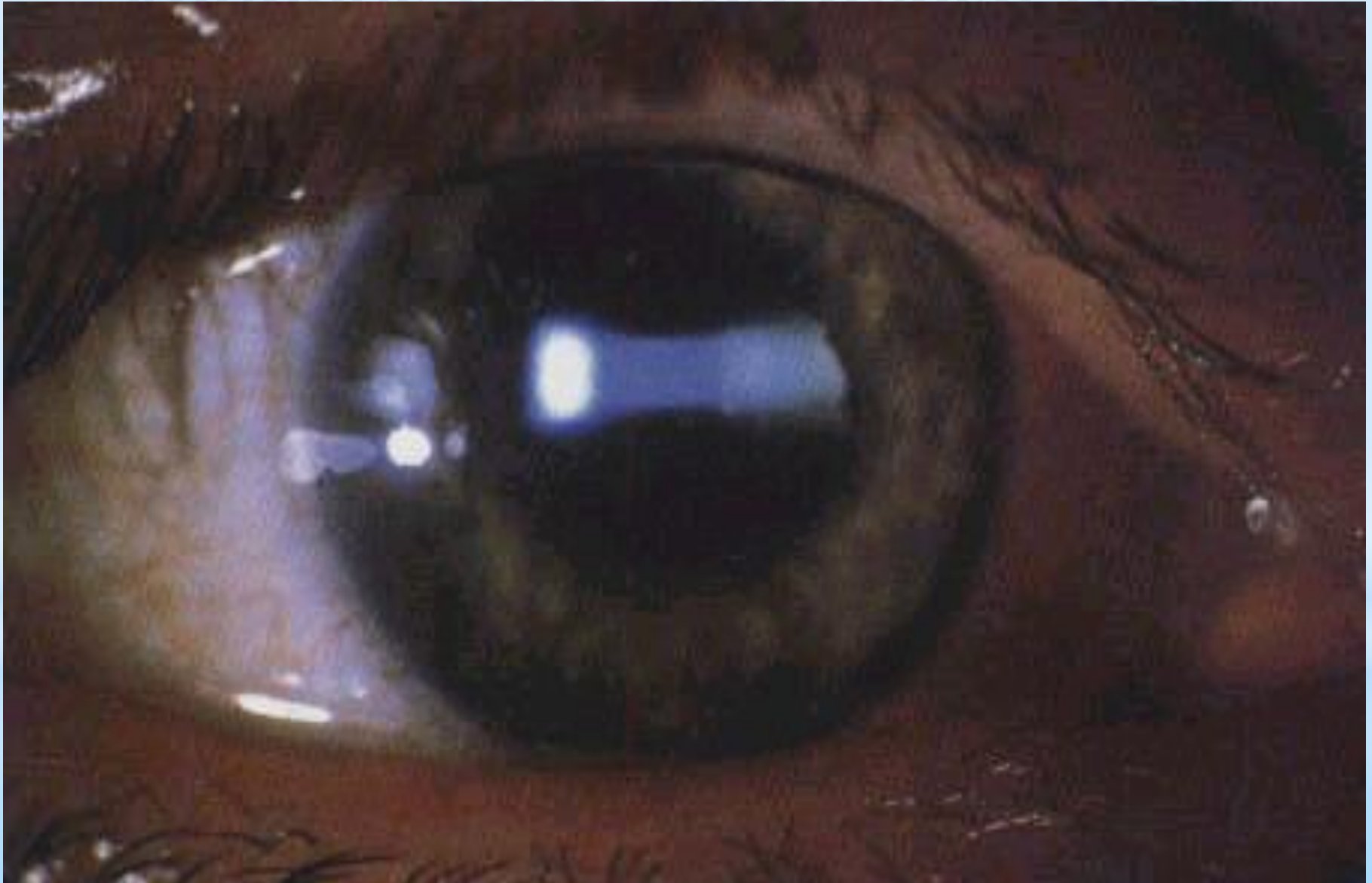
Ciliary injection in acute anterior uveitis



Old Keratic Precipitates (KPs)



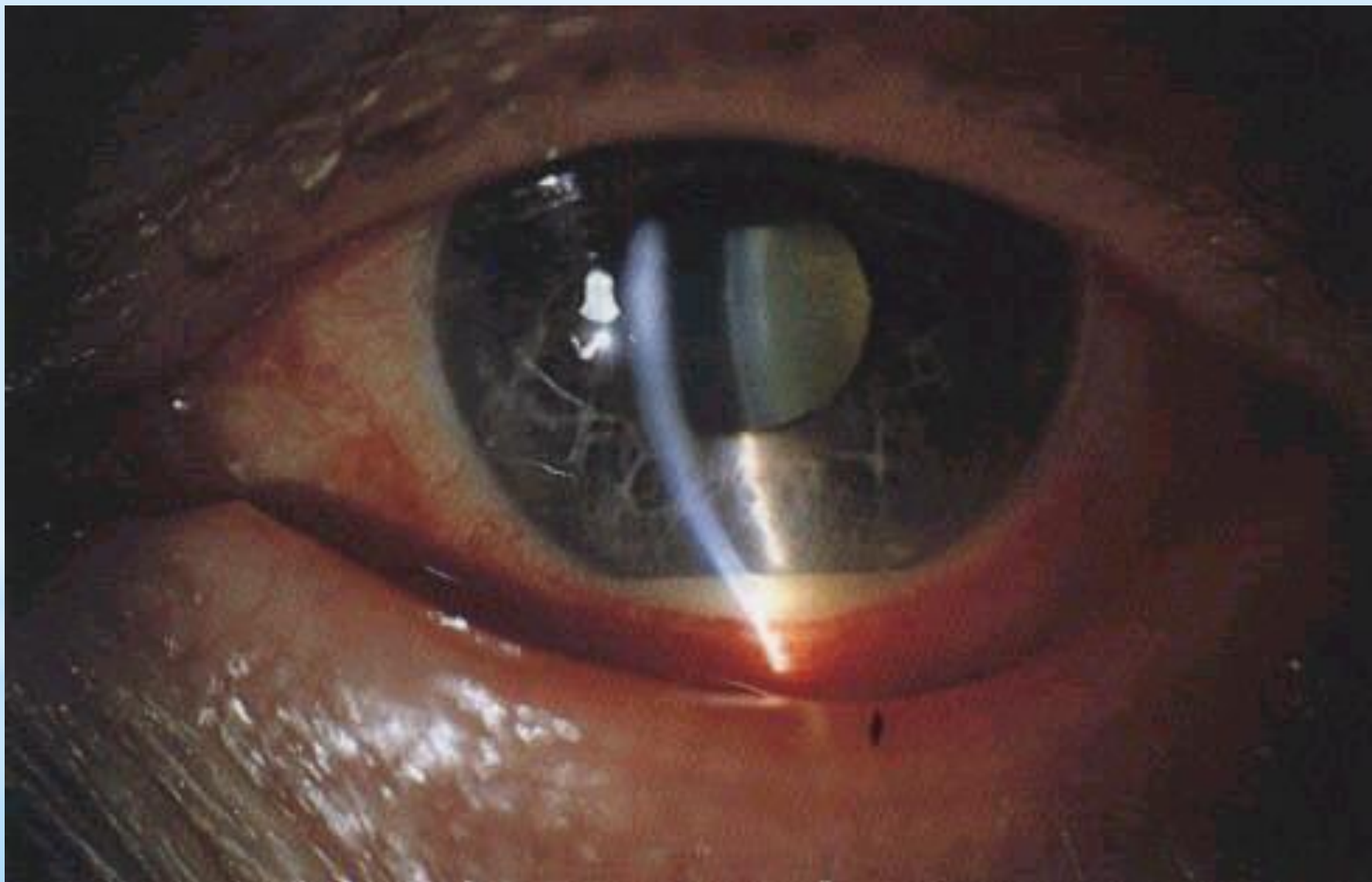
Aqueous cells and dense flare



Very severe acute anterior uveitis with fibrinous aqueous exudate



Hypopyon in Anterior Uveitis



Granulomatous anterior uveitis



Mutton Fat KPs

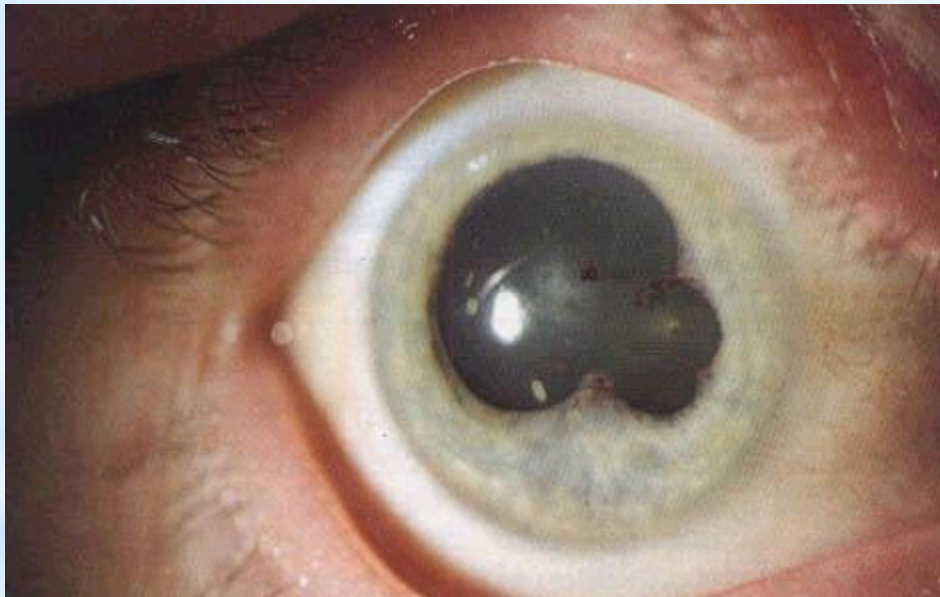


Koeppe nodules

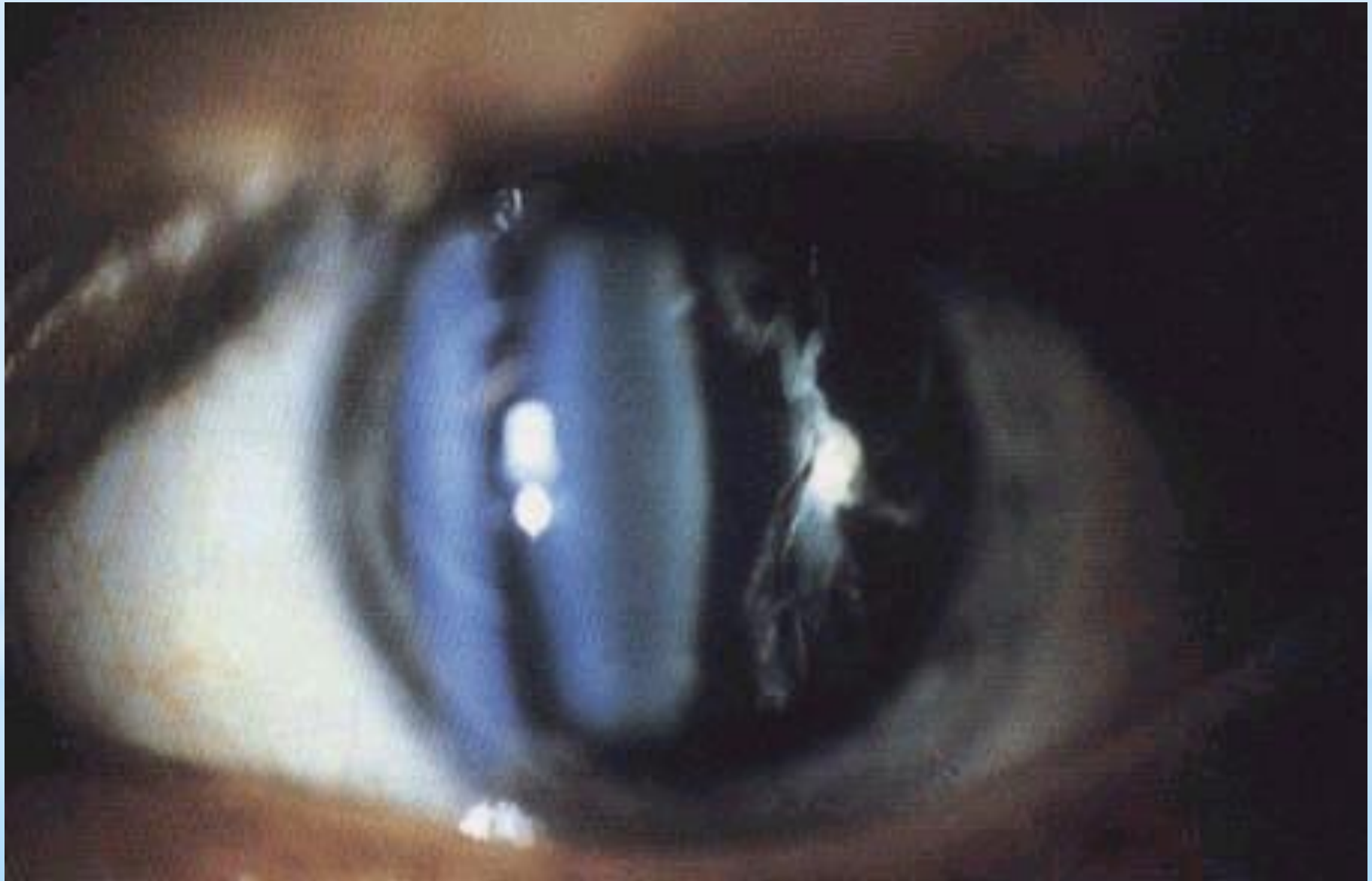


Busacca nodule

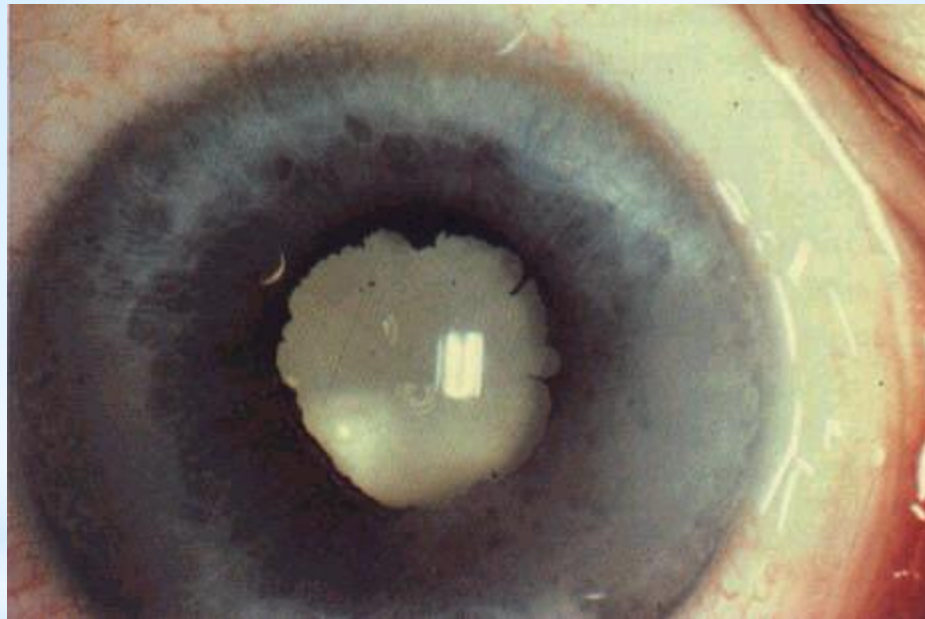
Posterior Synechiae following attack of acute anterior uveitis



'Snowball' vitreous opacities in pars planitis



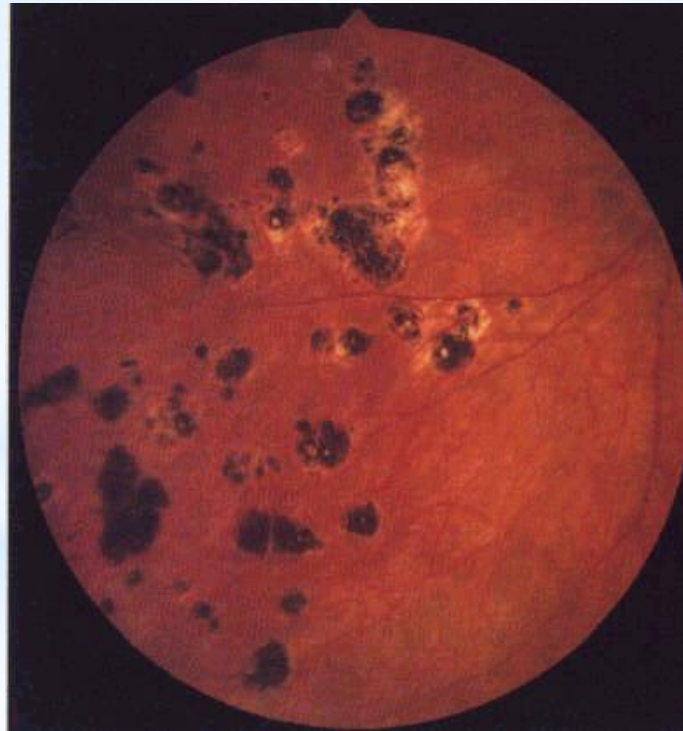
Band keratopathy and mature secondary cataract chronic iridocyclitis



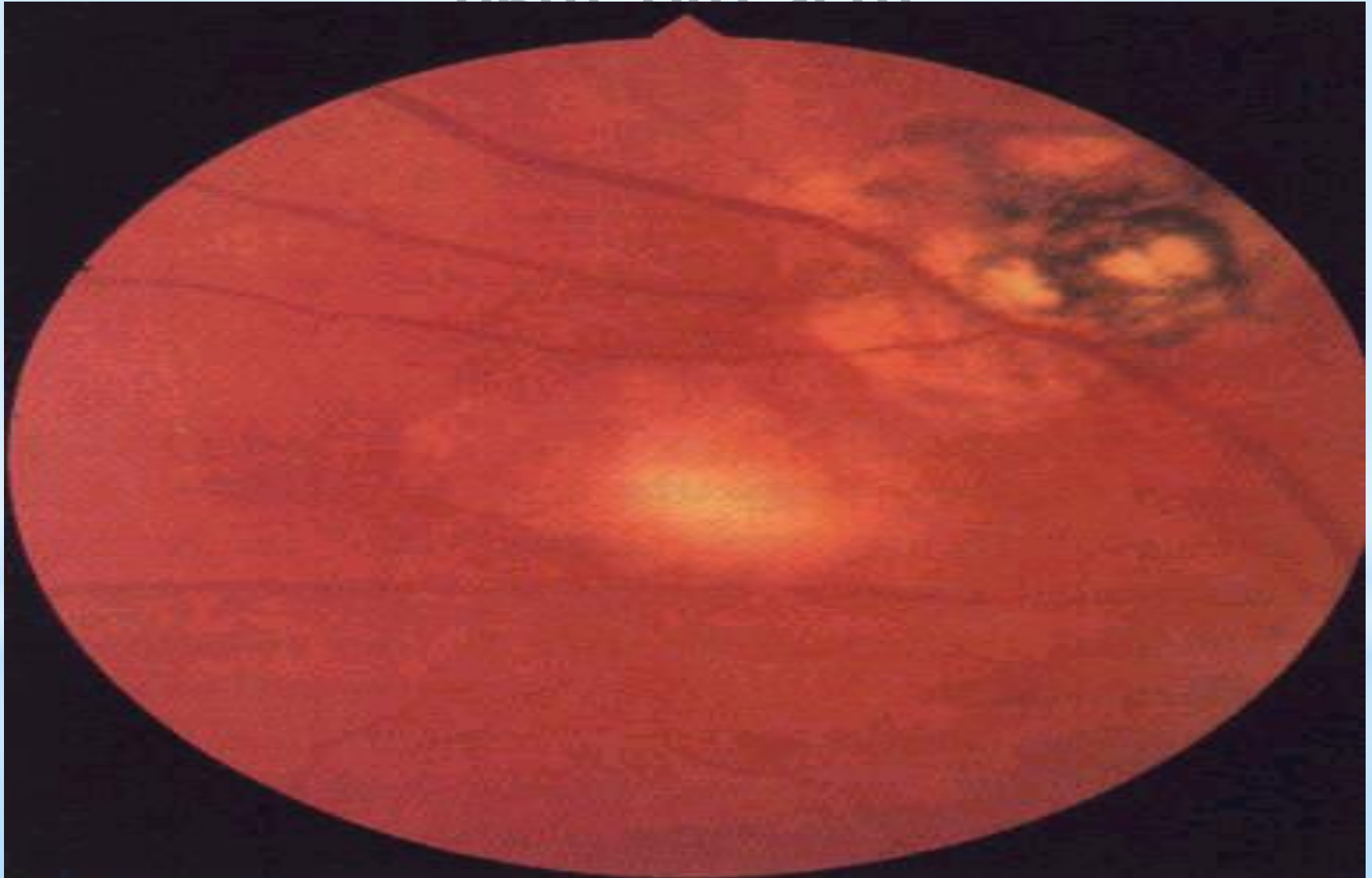
Active focal Choroiditis



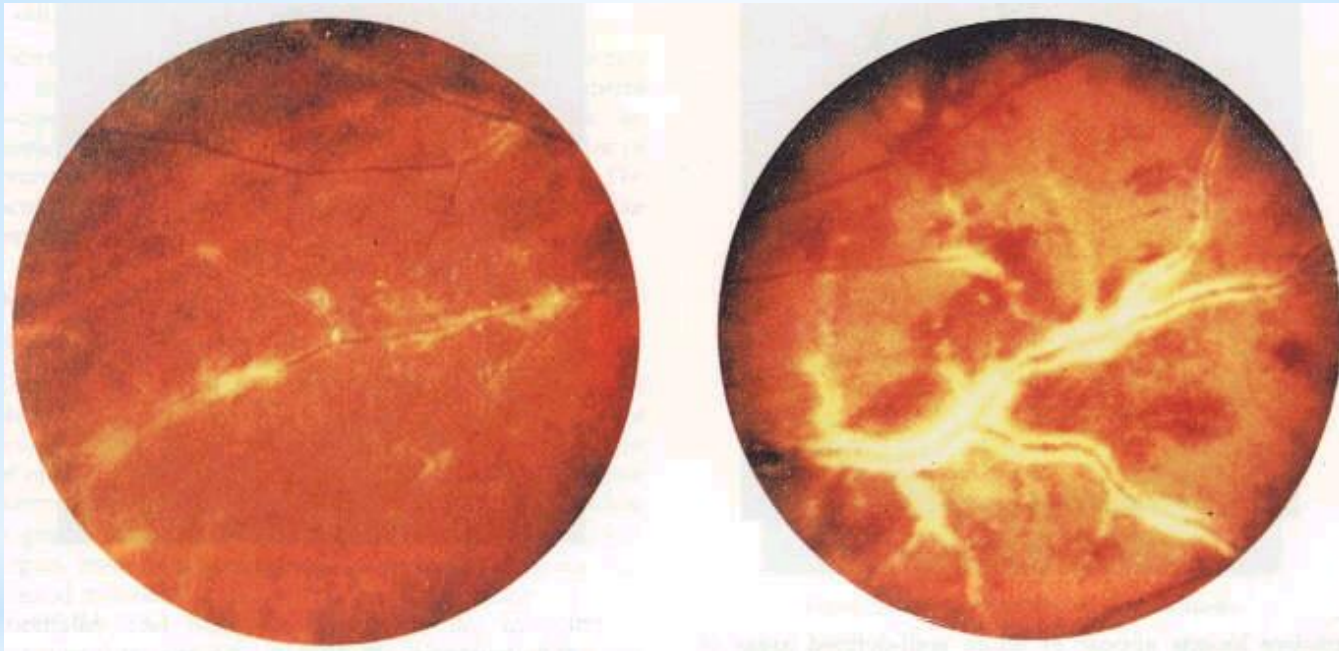
Old multifocal choroiditis



Active focal toxoplasma retinitis near old scar



Active retinal periphlebitis (early involvement and severe involvement)



Advanced Ankylosing Spondylitis. *Left:* (fixed flexion deformity; radiographic changes showing bilateral sclerosis and erosion of sacroiliac joints and bony fusion of spine

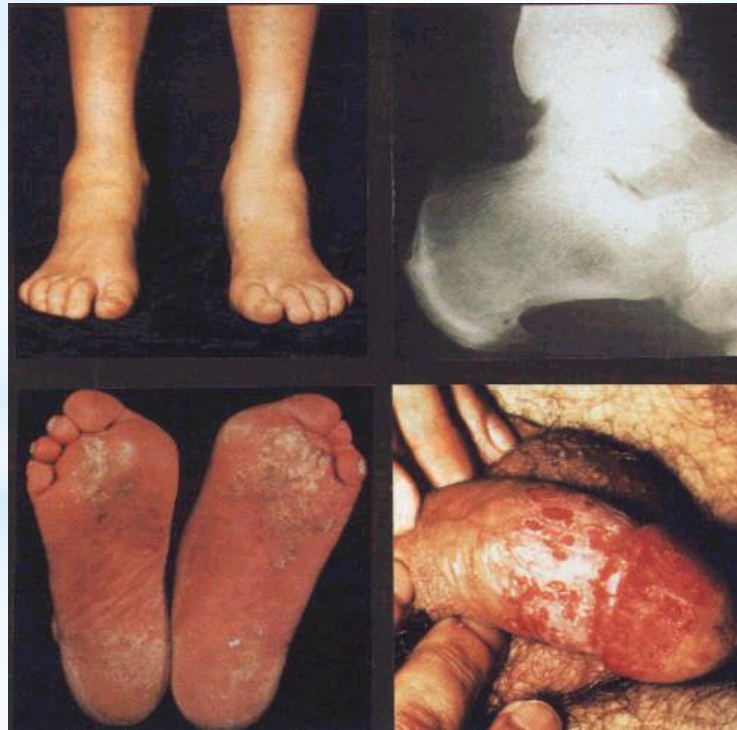


Very severe acute anterior uveitis with fibrinous aqueous exudate in ankylosing spondylitis



Reiter's disease

*(acute arthritis of ankles; radiograph showing calcaneal spur;
keratoderma blenorrhagica; circinate balanitis)*



Subepithelial corneal opacities in Reiter's keratitis



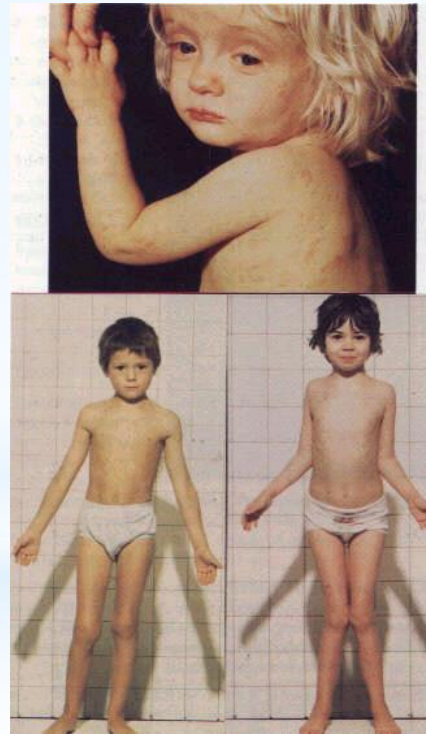
Psoriatic arthritis.

(severe psoriasis; sausage shaped fingers and severe nail dystrophy; nail pitting; onycholysis)

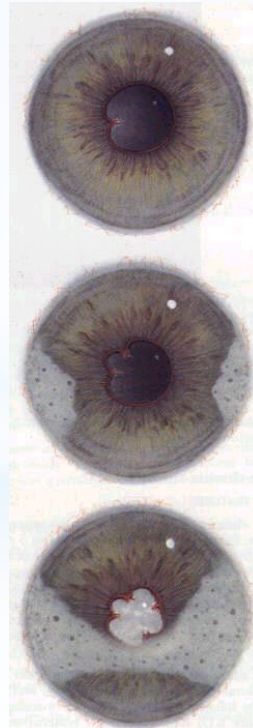


Juvenile chronic arthritis

(Maculopapular rash in systemic onset disease; pauciarticular involvement of right knee: polyarticular disease)



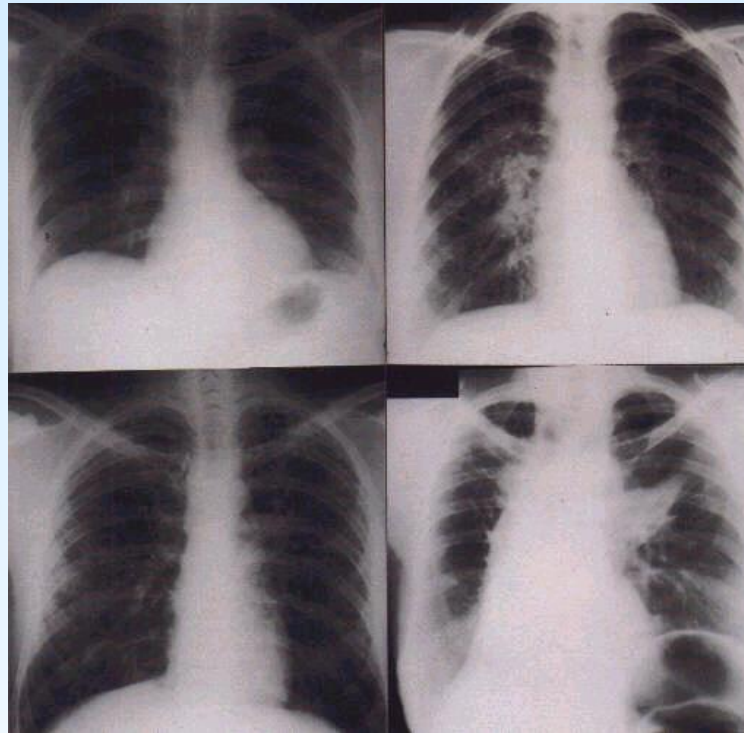
Progression of complications of chronic anterior uveitis associated with juvenile chronic arthritis (a) Posterior synechiae formation; (b) increase in number of posterior synechiae and early band keratopathy; (c) extensive band keratopathy and mature cataract



Sarcoidosis

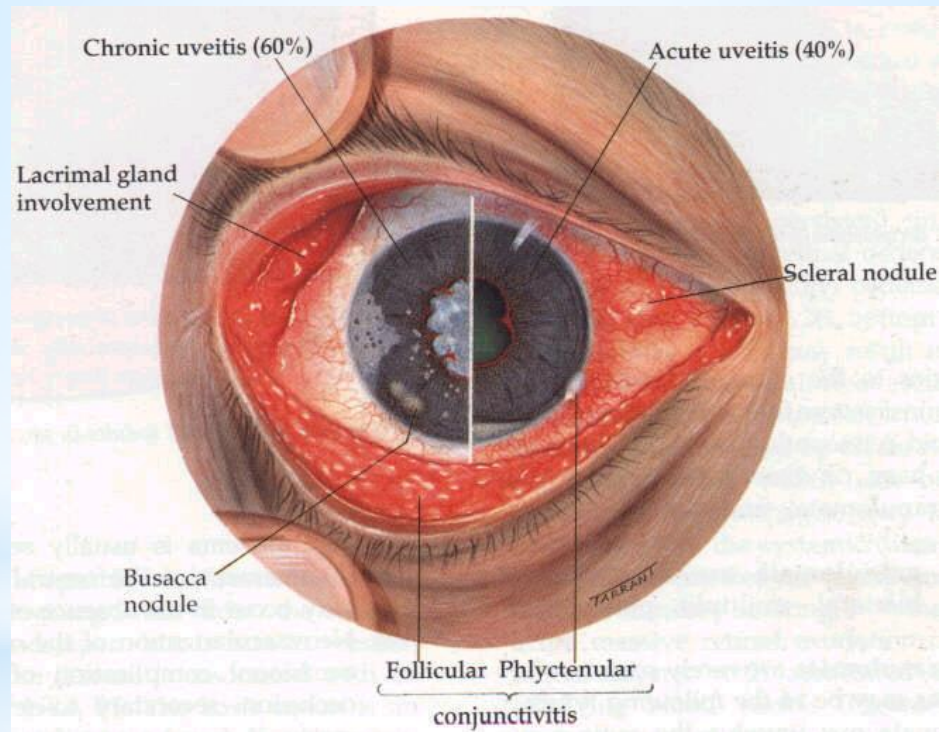
(erythema nodosum; parotid enlargement; eyelid infiltration;
cheek infiltration)



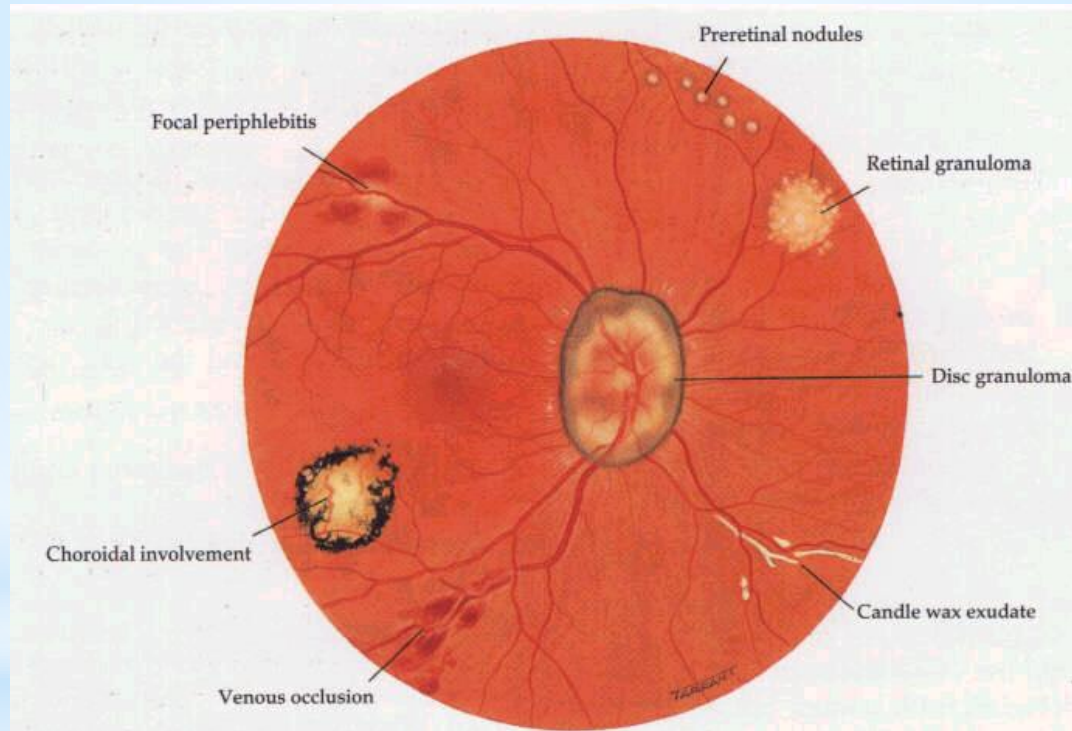


Staging of chest radiographic signs in sarcoidosis. top left: bilateral hilar adenopathy (stage 1); top right: hilar adenopathy and reticulonodular parenchymal infiltrates (stage 2); bottom left: reticulonodular infiltrates alone (stage 3); bottom right: pulmonary fibrosis (stage 4)

Anterior segment complications of sarcoidosis



Posterior segment complications of Sarcoidosis

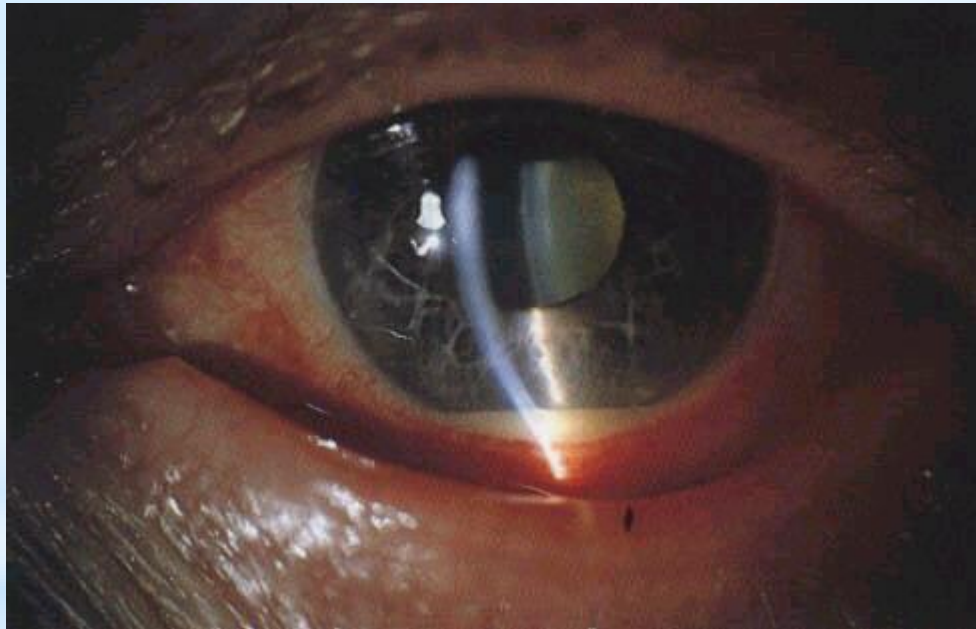


Behçet's disease

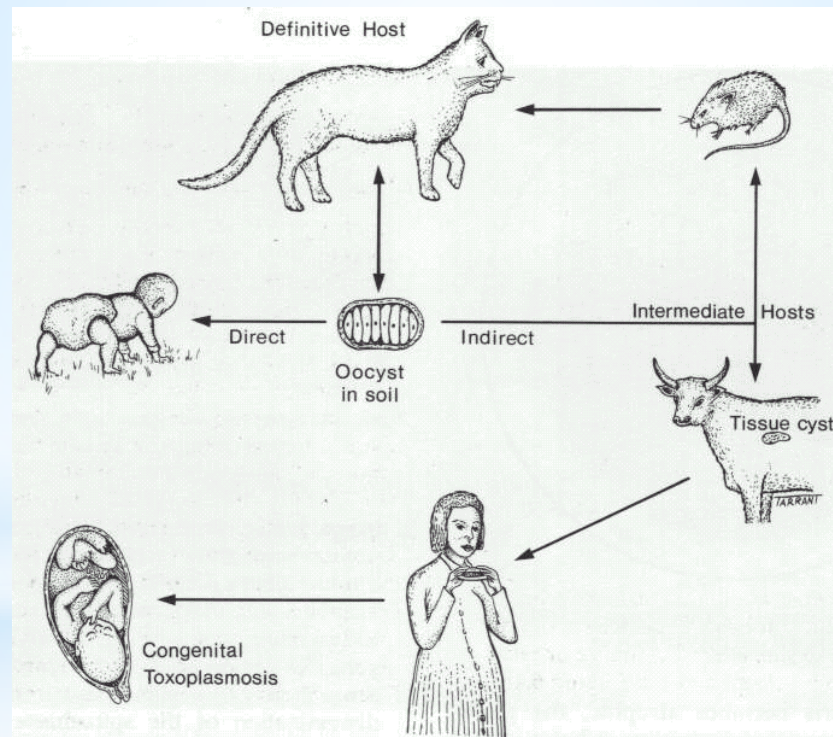
(ulcer of buccal mucosa; ulcer of tongue; genital ulceration; leg oedema secondary to severe thrombophlebitis)



Hypopyon in anterior uveitis associated with Behçet's disease



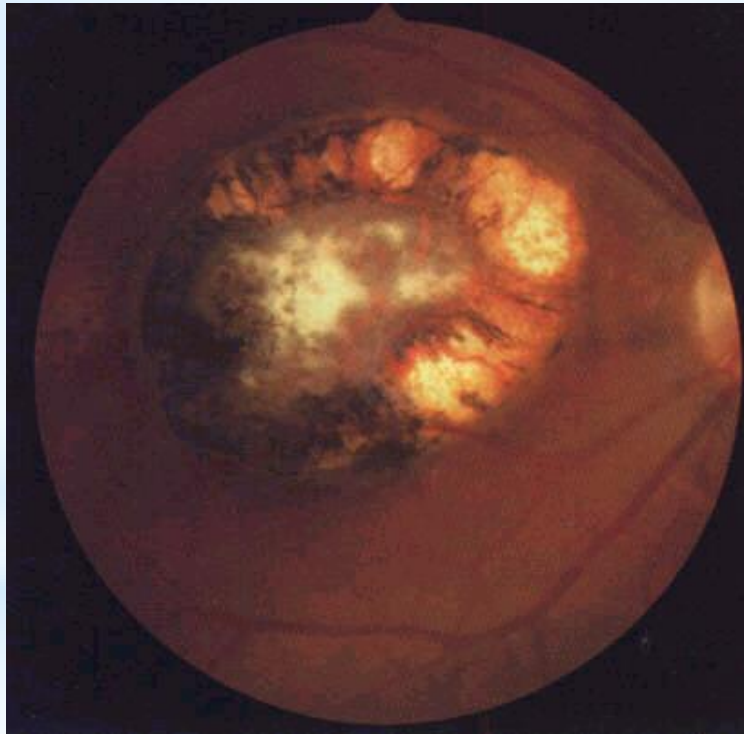
Life cycle of Toxoplasma gondii



Intracranial calcification in congenital toxoplasmosis



Macular scar in congenital toxoplasmosis



Posterior segment complications of Behçet's disease

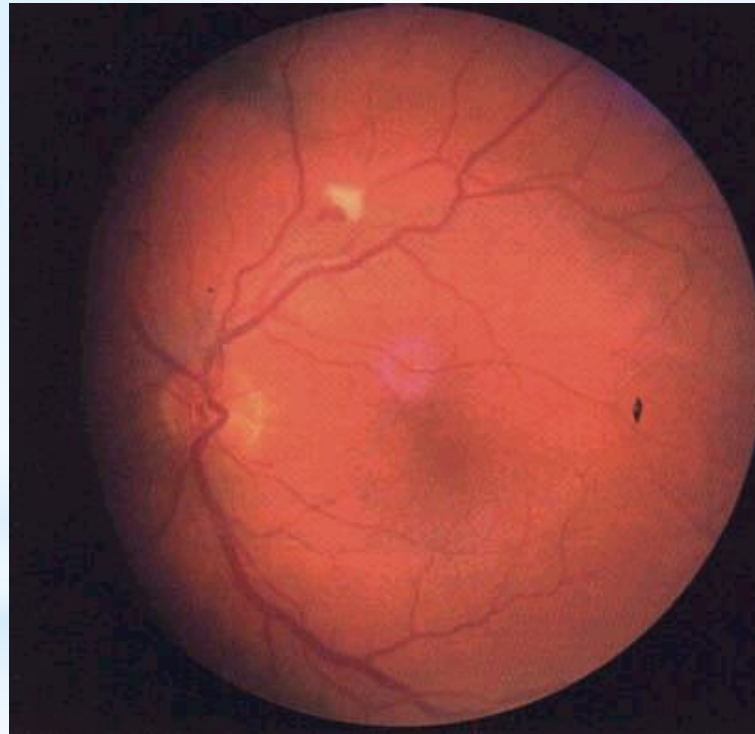
BRVO caused by periphlebitis; retinal infiltrates; massive retinal exudation; atrophy and vascular sheathing; composite of posterior segment manifestations)



Kaposi's sarcoma



Retinal microangiopathy in AIDS

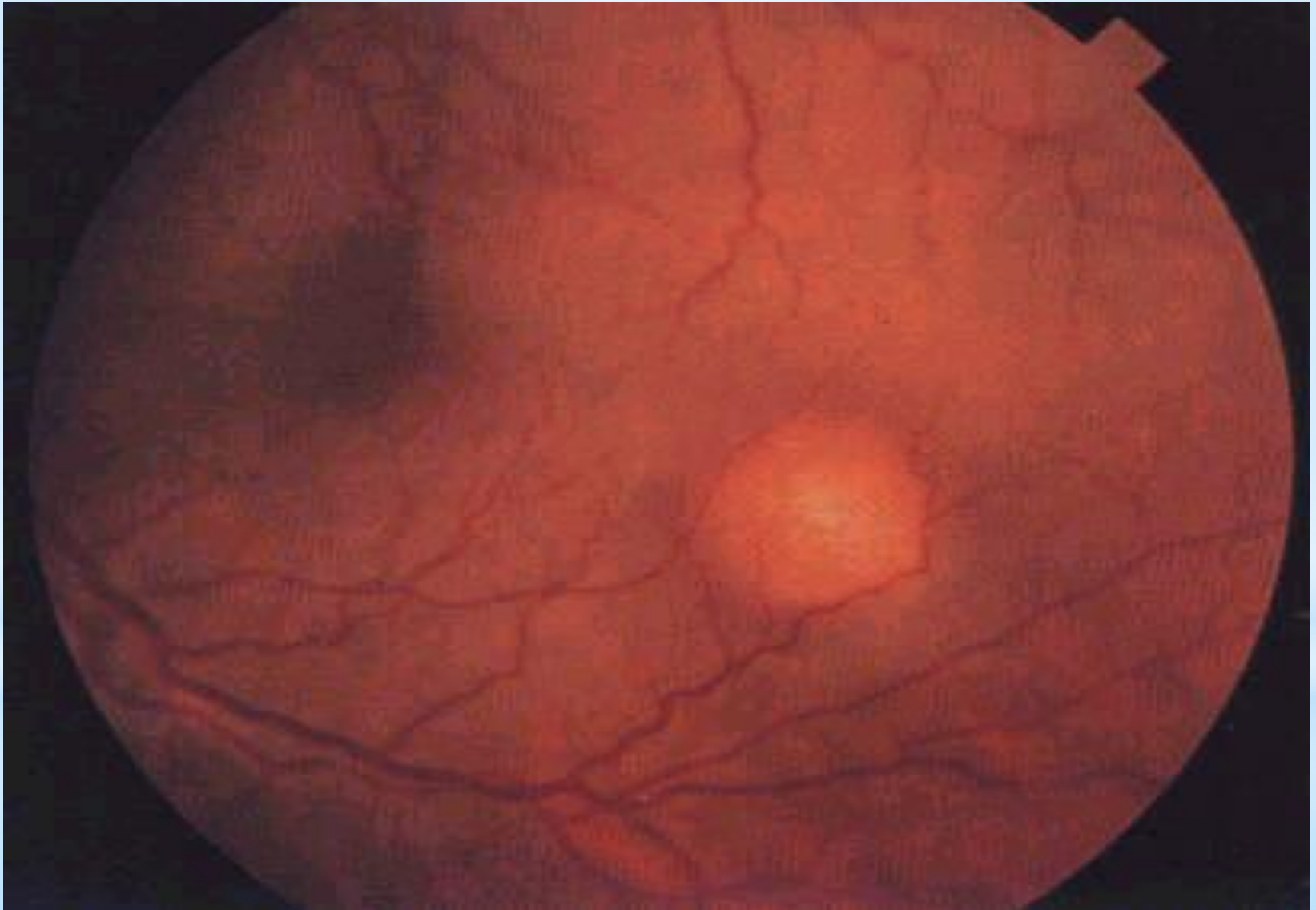


Cytomegalovirus retinitis in AIDS

*granular peripheral retinitis; central retinitis; venous sheathing;
central retinitis with haemorrhage; optic nerve involvement;
advanced stage*



Solitary tuberculous choroidal granuloma



Advanced leprosy



Leprosy

severe corneal scarring; lagophthalmos

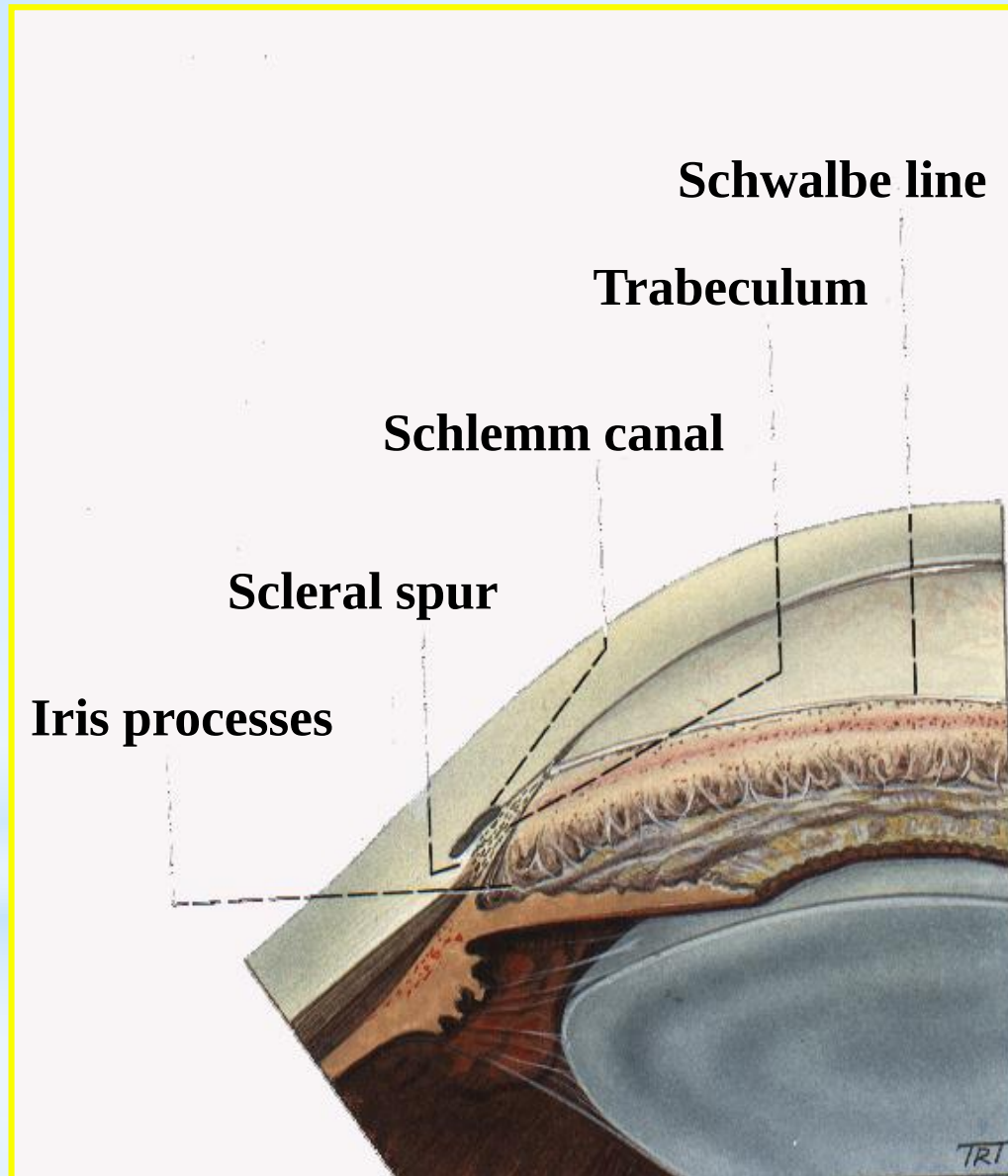




Figure 6.62 Technique of posterior sub-Tenon's injection.
Top left: steroid drawn up; top right: 25-gauge 16 mm needle used for injection; bottom left: conjunctiva anaesthetized with cotton pledget soaked in topical anaesthetic; bottom right: injection given close to sclera

GLAUCOMA

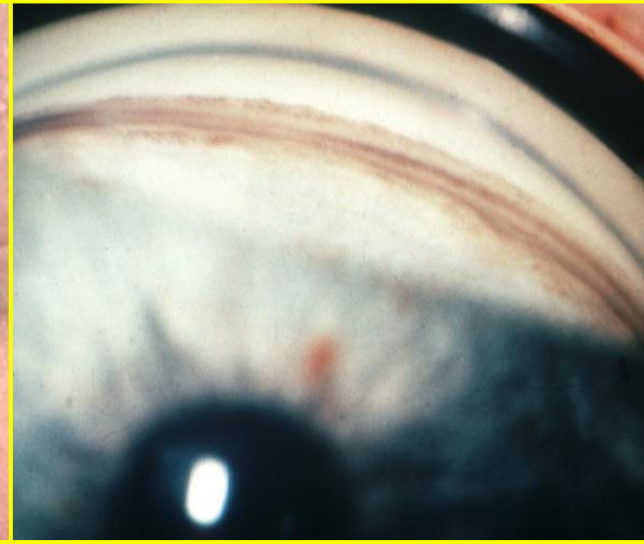
Angle structures



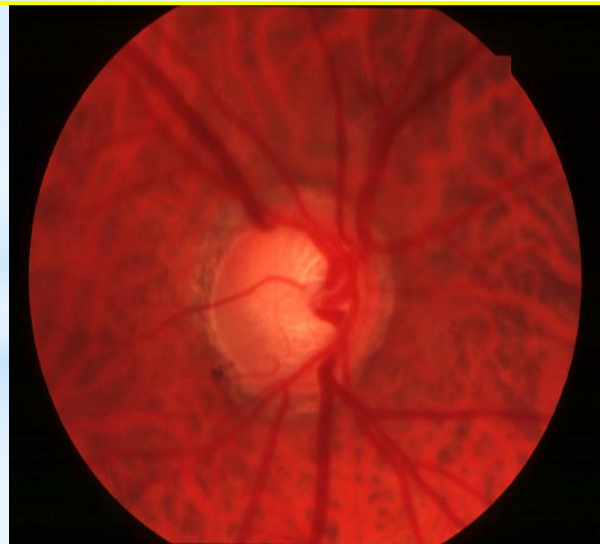
Primary Open Angle Glaucoma



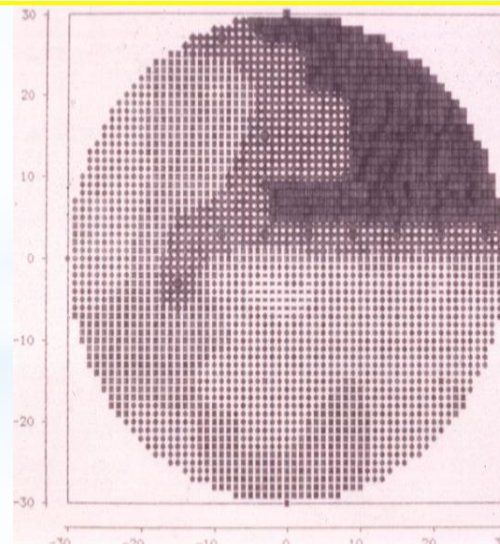
IOP > 21 mmHg



Open angle of normal appearance

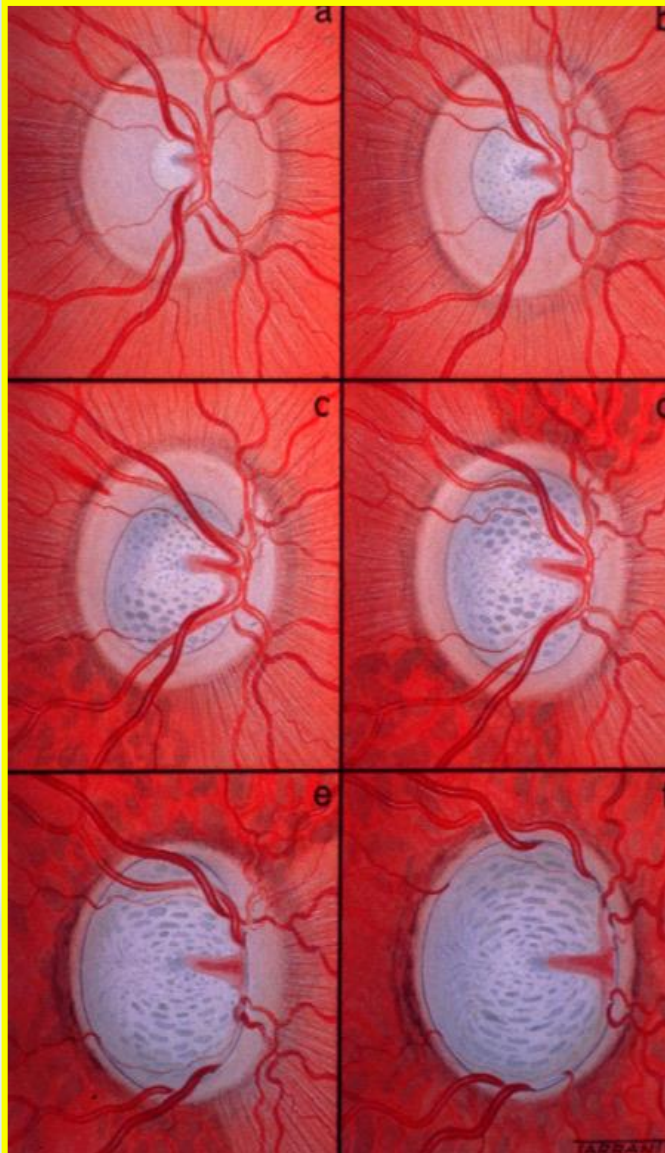


Glaucomatous disc damage



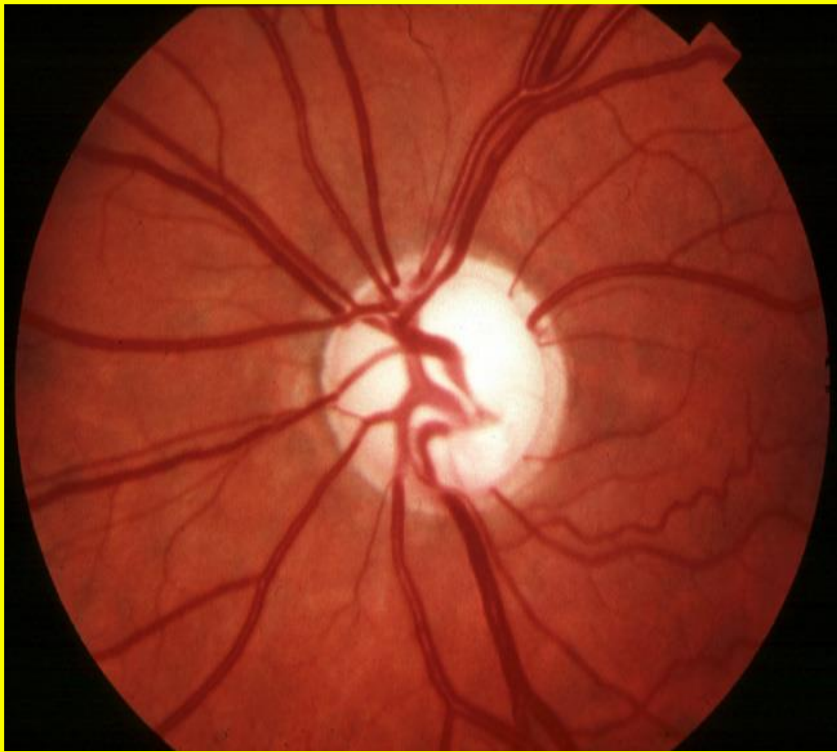
Visual field loss

Progression of glaucomatous cupping

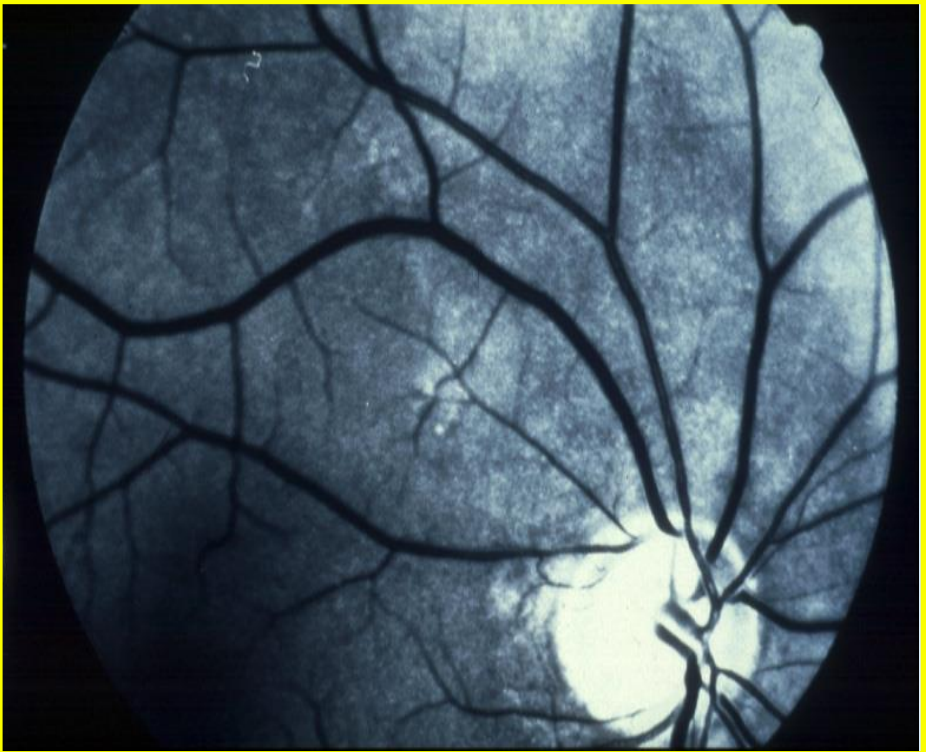


- a. Normal (c:d ratio 0.2)**
- b. Concentric enlargement (c:d ratio 0.5)**
- c. Inferior expansion with retinal nerve fibre loss**
- d. Superior expansion with retinal nerve fibre loss**
- e. Advanced cupping with nasal displacement of vessels**
- f. Total cupping with loss of all retinal nerve fibres**

End-stage damage



- All neural disc tissue is destroyed
- Disc is white and deeply excavated



- Atrophy of all retinal nerve fibres
- Striations are absent
- Blood vessels appear dark and sharply defined

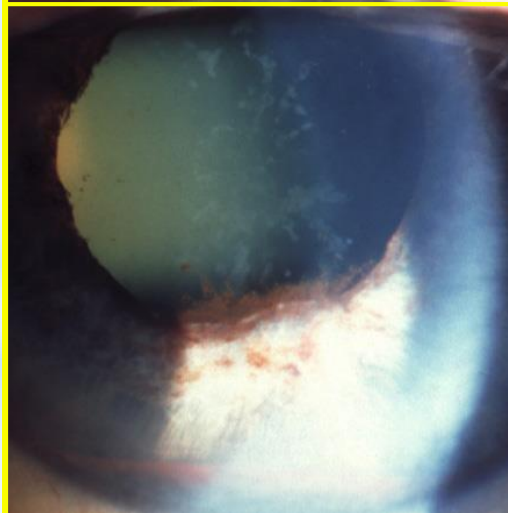
Signs of postcongestive angle-closure glaucoma



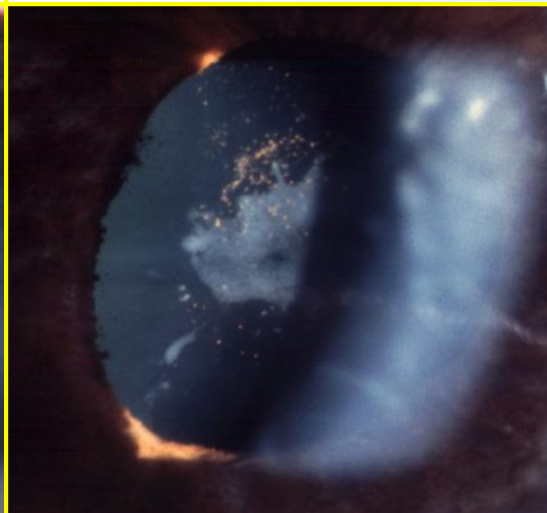
- Folds in Descemet membrane



- Stromal iris atrophy with spiral-like configuration



- Posterior synechiae
- Fine pigment on iris



- Fixed dilated pupil
- Glaukomflecken

Clinical features of primary congenital glaucoma

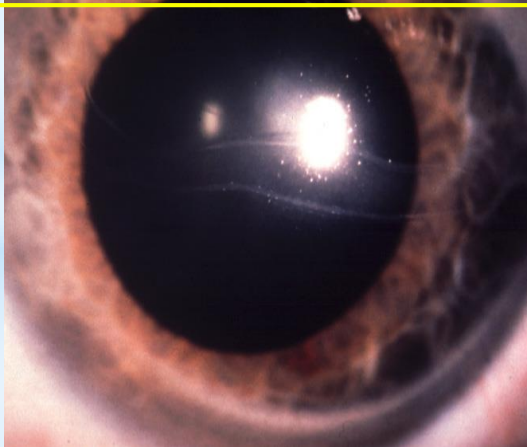
- Depend on age of onset
- Bilateral in 75% but frequently asymmetrical



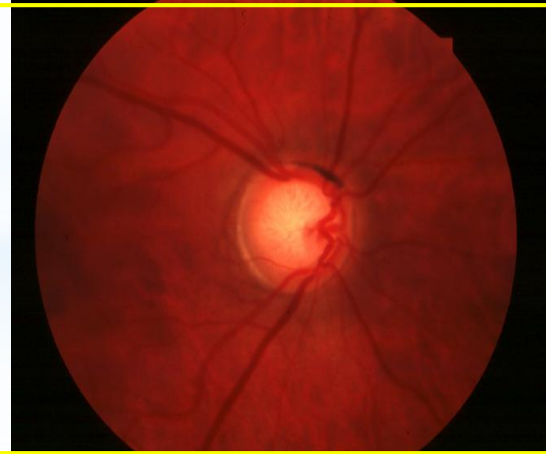
**Corneal oedema associated with
lacrimation and photophobia**



**Buphthalmos if IOP becomes
elevated prior to age 3 years.**

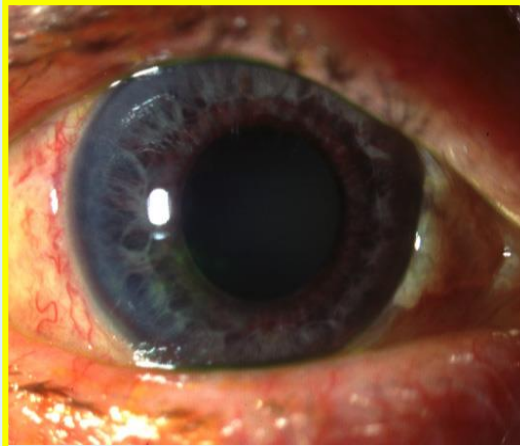


Breaks in Descemet membrane



Optic disc cupping

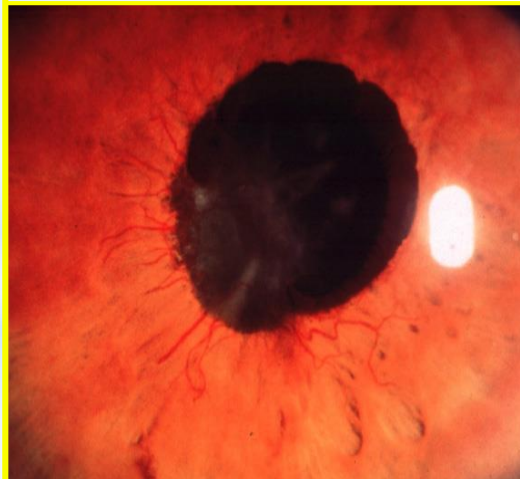
Neovascular Glaucoma (Rubeosis Iridis)



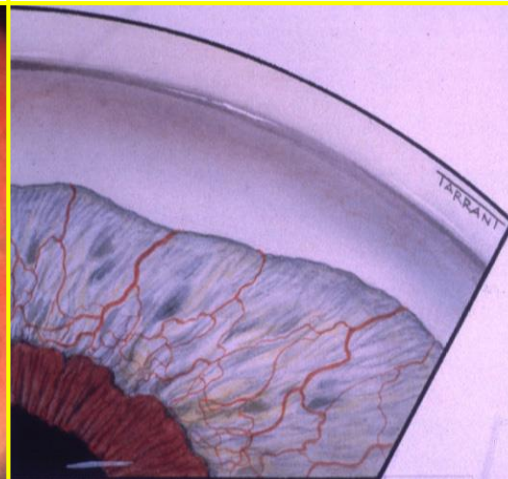
Severely reduced visual acuity, congestion and pain



Severe rubeosis iridis



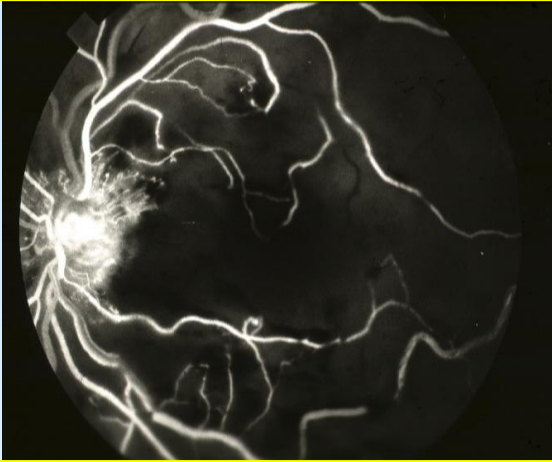
Distortion of pupil and ectropion uveae



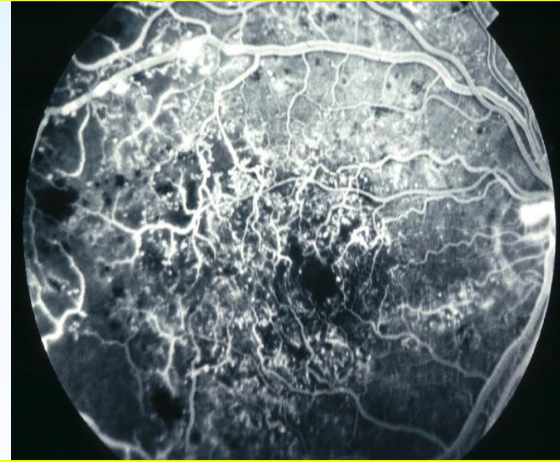
Synechial angle closure

Causes of Neovascular glaucoma

- Common, secondary angle-closure glaucoma



Ischaemic central retinal vein occlusion (most common)



Long-standing diabetes (common)



Central retinal artery occlusion (uncommon)



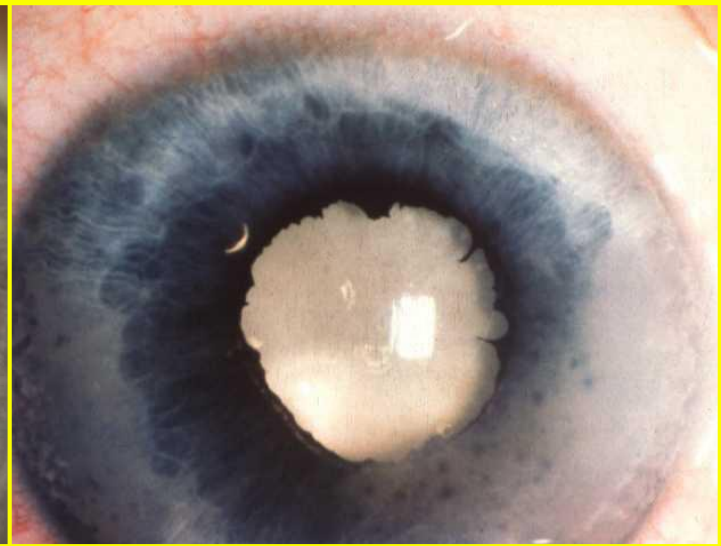
Carotid obstructive disease (uncommon)

UVEITIS

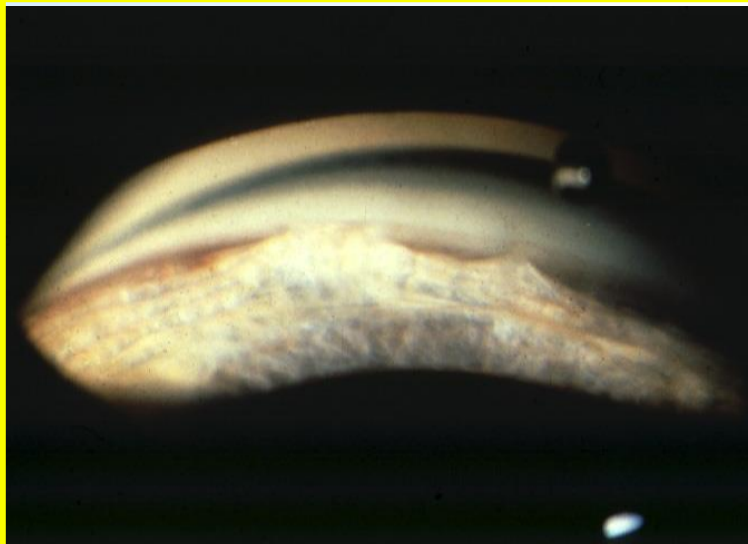
Complications of Anterior Uveitis



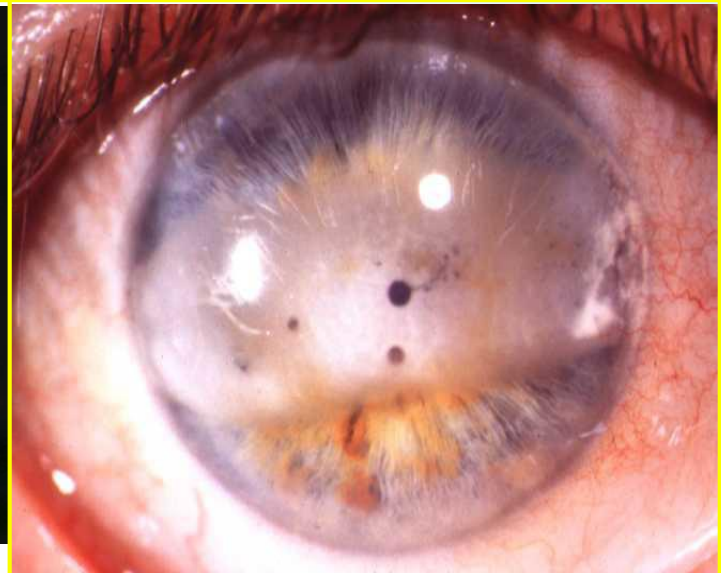
Posterior synechiae - 30%



Cataract -20%



Glaucoma due to PAS - 15%



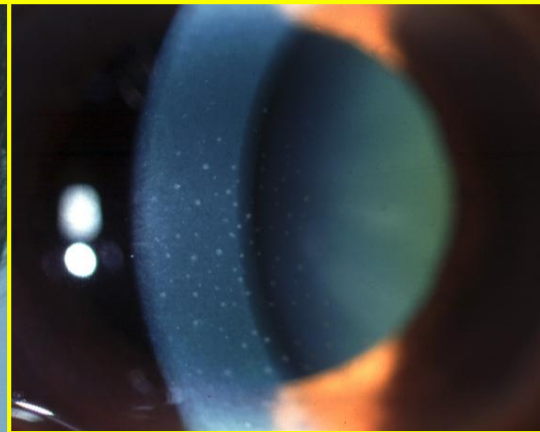
Band keratopathy - 10%

Herpes zoster ophthalmicus

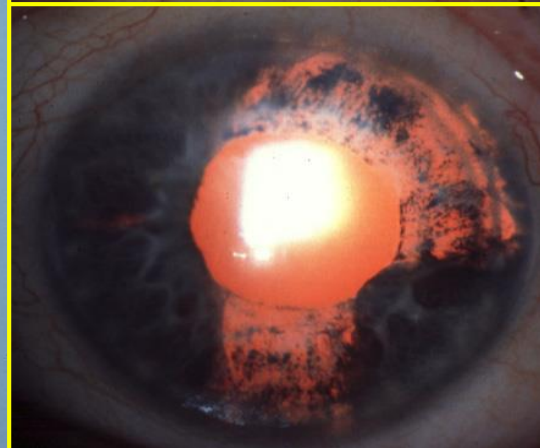
- Iritis in 40% of cases
- Within 3 weeks of onset of rash



Particularly if external nasal branch involved - Hutchinson sign



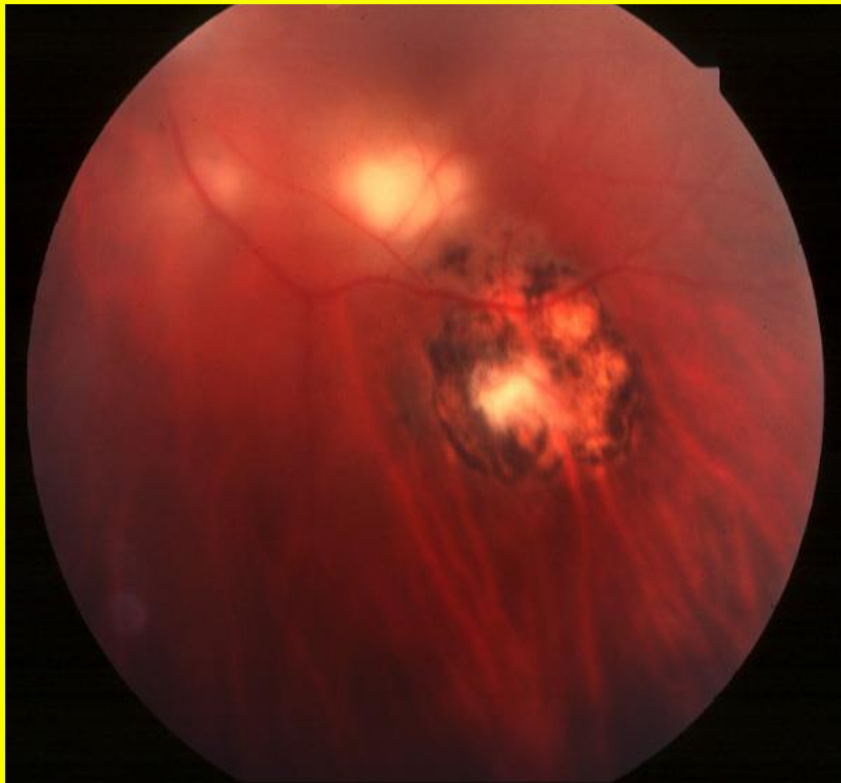
Small-medium KP



Iris atrophy - 20%

Toxoplasmosis

- Recurrence of healed congenital lesion
- Usually between ages 10-35 years.



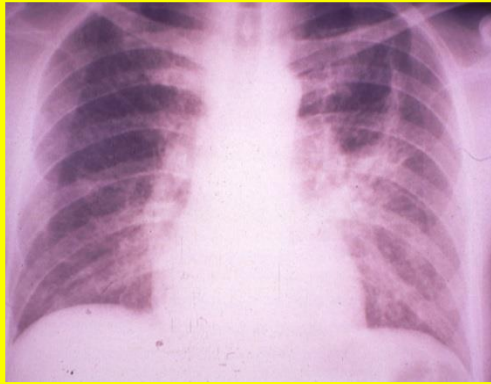
Unifocal retinitis adjacent to old scar
- heals within 1 to 4 months



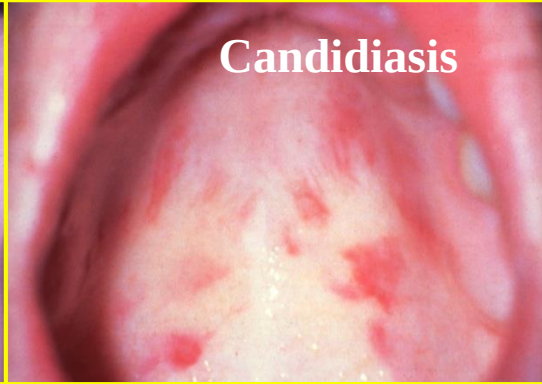
Vitritis may be severe
- 'headlight in fog'

Acquired immune deficiency syndrome (AIDS)

Opportunistic infections



- *Pneumocystis carinii* pneumonia



Candidiasis

- Toxoplasmosis
- Atypical mycobacterium
- Cytomegalovirus
- Cryptococcus

Neoplasms



- Kaposi sarcoma



- Lymphoma

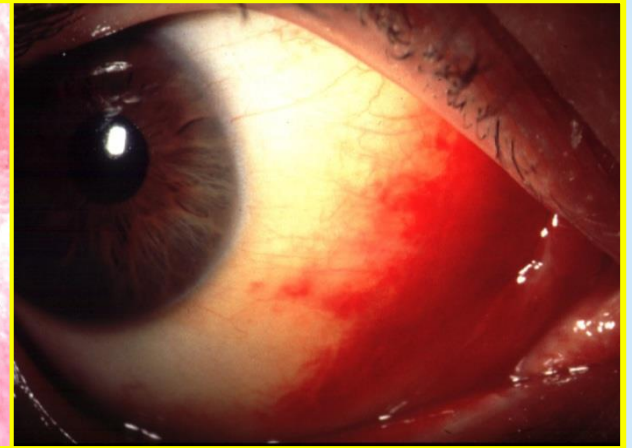
Anterior features



Multiple molluscum contagiosum



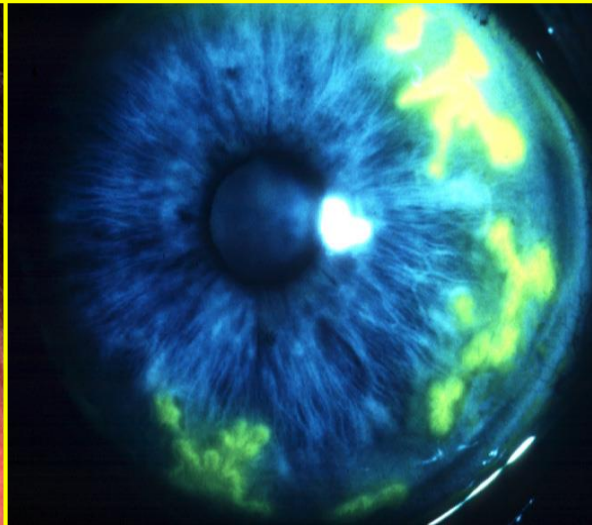
Eyelid Kaposi sarcoma



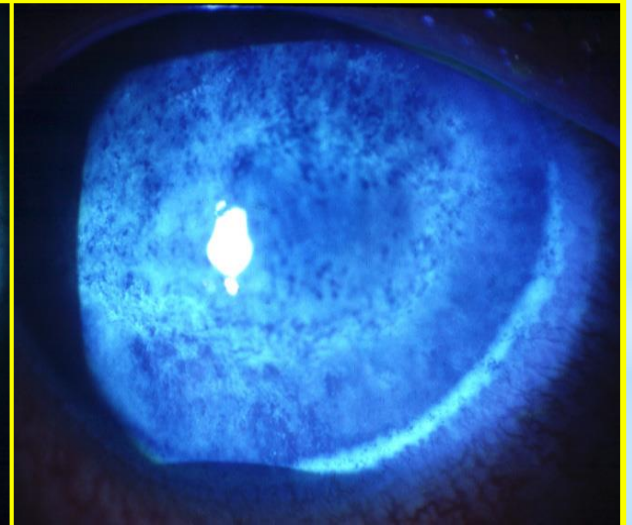
Conjunctival Kaposi sarcoma



Severe herpes zoster ophthalmicus

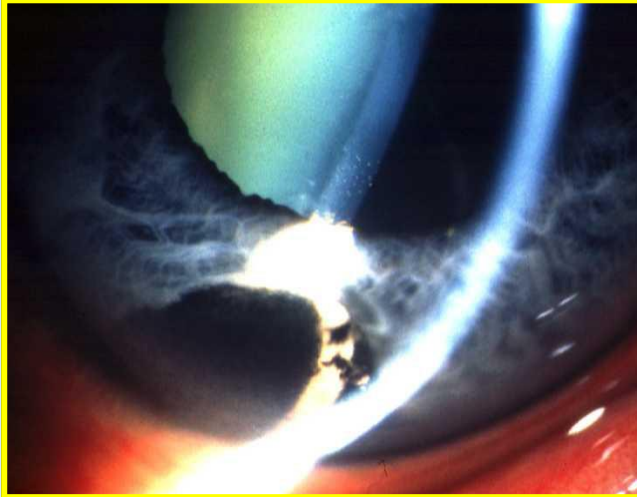


Peripheral herpes simplex keratitis



Microsporidial keratitis

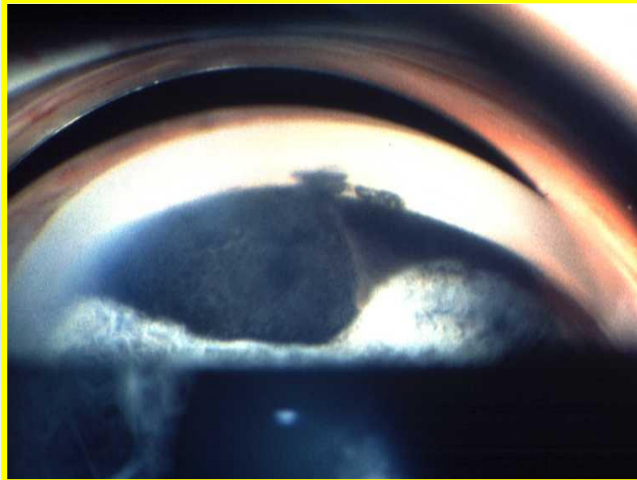
Iris melanoma



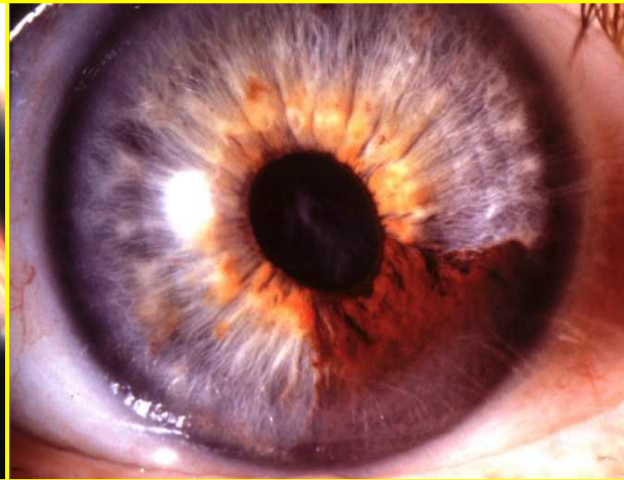
- Usually pigmented nodule at least 3 mm in diameter
- Invariably in inferior half of iris



- Occasionally non-pigmented
- Surface vascularization

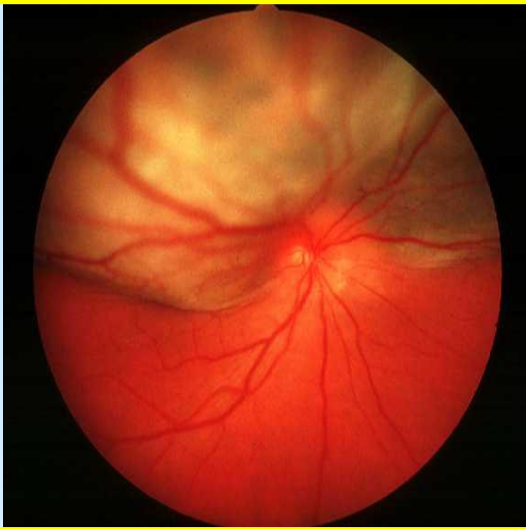


- Angle involvement may cause glaucoma

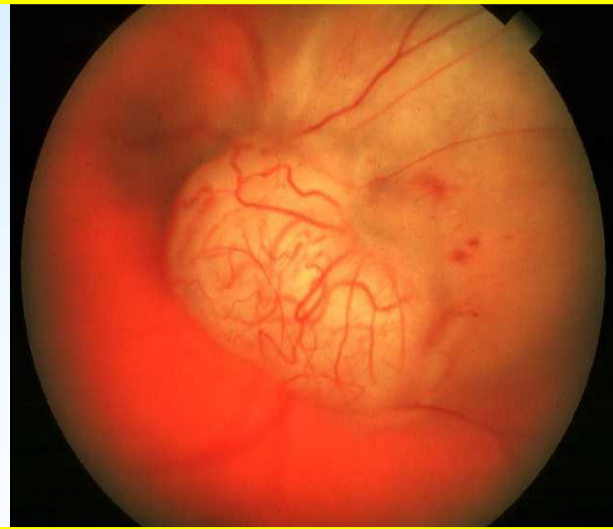


- Pupillary distortion, ectropion uveae and cataract

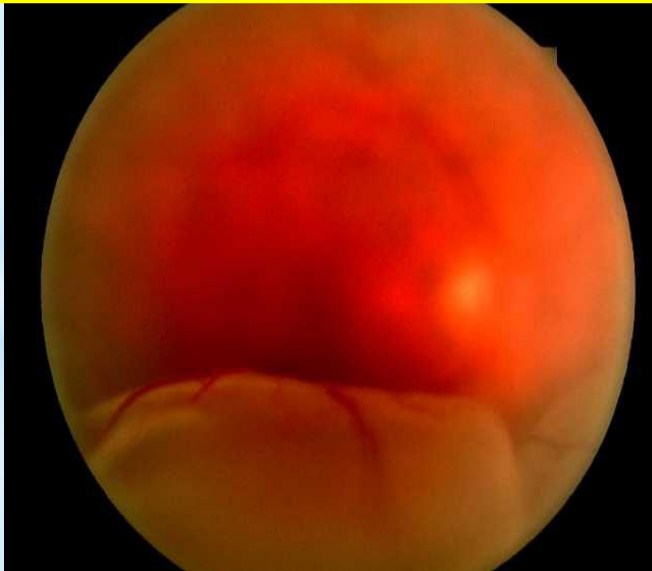
Choroidal melanoma



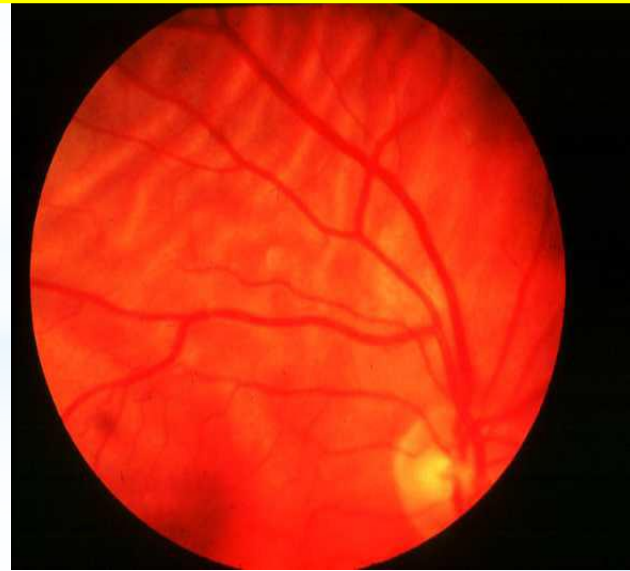
- **Brown, elevated, subretinal mass**



- **Occasionally amelanotic**
- **Double circulation**



- **Secondary retinal detachment**



- **Choroidal folds**

Choroidal melanoma



- Surface orange pigment (lipofuscin) is common
- Mushroom-shaped if breaks through Bruch's membrane



- Ultrasound - acoustic hollowness, choroidal excavation and orbital shadowing

RETINA

DIABETIC RETINOPATHY

1. Background diabetic retinopathy
2. Pre-proliferative diabetic retinopathy
3. Proliferative diabetic retinopathy
4. Diabetic Maculopathies
 - Focal
 - Diffuse
 - Ischaemic

Background diabetic retinopathy



Microaneurysms usually temporal to fovea



Intraretinal dot and blot haemorrhages



Hard exudates frequently arranged in clumps or rings



Retinal oedema seen as thickening on biomicroscopy

Preproliferative diabetic retinopathy

Signs



- Cotton-wool spots
- Venous irregularities



- Dark blot haemorrhages
- Intraretinal microvascular abnormalities (IRMA)

Treatment - not required but watch for proliferative disease

Proliferative diabetic retinopathy

- Affects 5-10% of diabetics
- IDDD at increased risk (60% after 30 years)

Neovascularization

- Flat or elevated

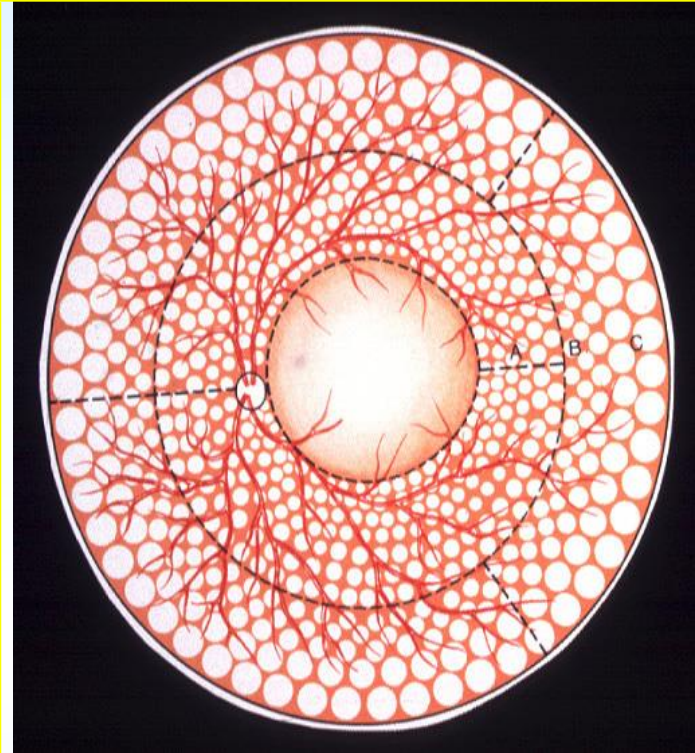
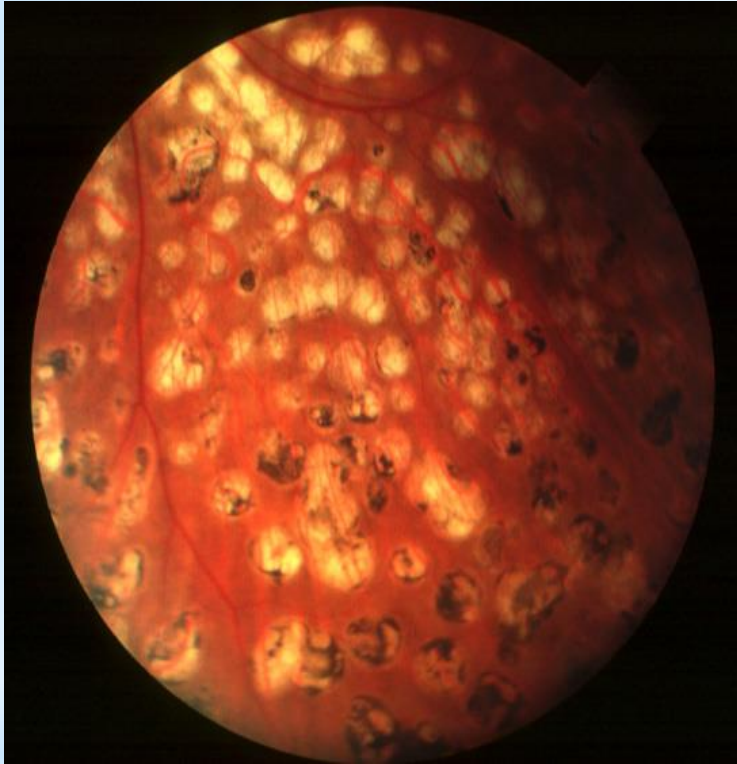


Neovascularization of disc = NVD



Neovascularization elsewhere = NVE

Laser panretinal photocoagulation



- **Area covered by complete PRP**
- **Follow-up 4 to 8 weeks**

Branch retinal vein occlusion (BRVO)

Signs of acute BRVO



- Venous tortuosity and dilatation
- Flame-shaped and 'dot-blot' haemorrhages
- Cotton-wool spots and retinal oedema

Prognosis - VA 6/12 or better after 6 months in 50%

Complications - chronic macular oedema and neovascularization

Central retinal vein occlusion (CRVO)

Signs of CRVO



- Venous tortuosity and dilatation
- Retinal haemorrhages
- Cotton-wool spots
- Disc oedema
- Chronic macular oedema

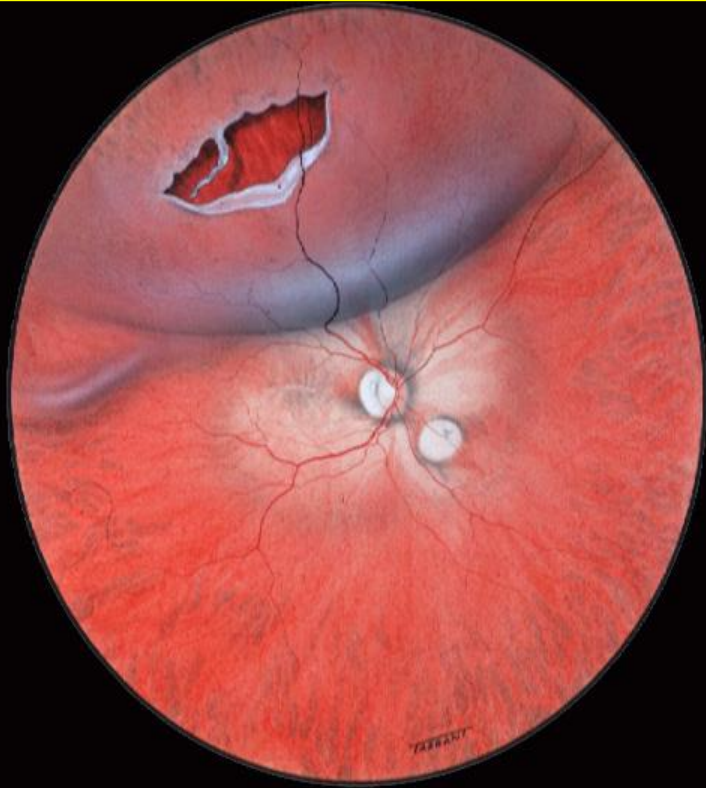
Central retinal artery occlusion (CRAO)



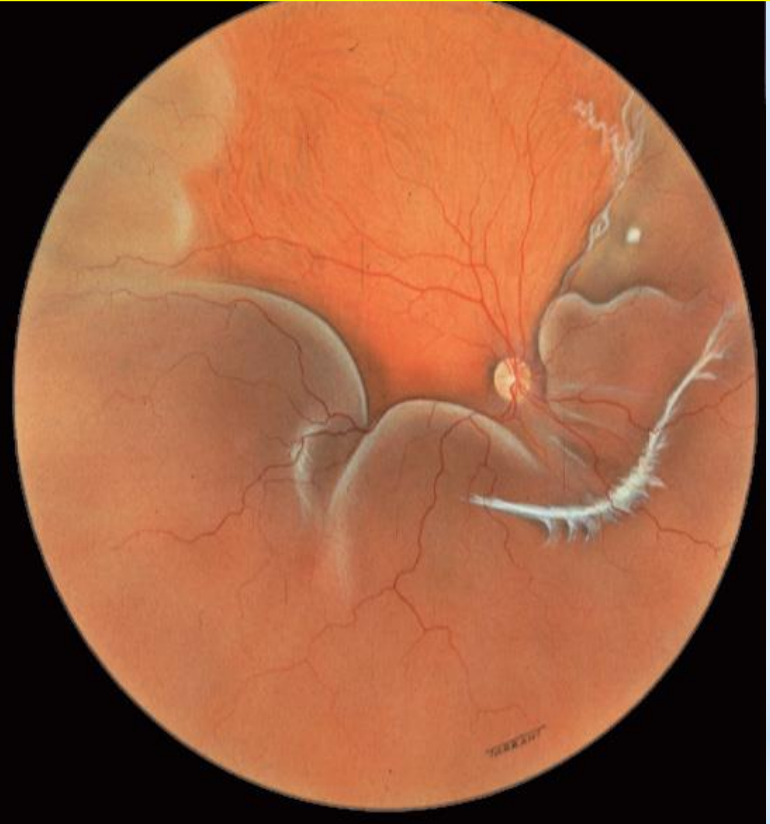
- **Retinal whitening**
- **‘Cherry-red spot’ at macula**
- **Arteriolar and venular narrowing**
- **Sludging and segmentation of blood column (cattle-trucking)**
- **Very poor prognosis**

Retinal detachment (RD)

Separation of sensory retina from RPE by subretinal fluid (SRF)



Rhegmatogenous - caused by
a retinal break



Non-rhegmatogenous - tractional
or exudative

Fresh Rhegmatogenous RD - signs

- Annual incidence - 1:10,000 of population
- Eventually bilateral in 10%



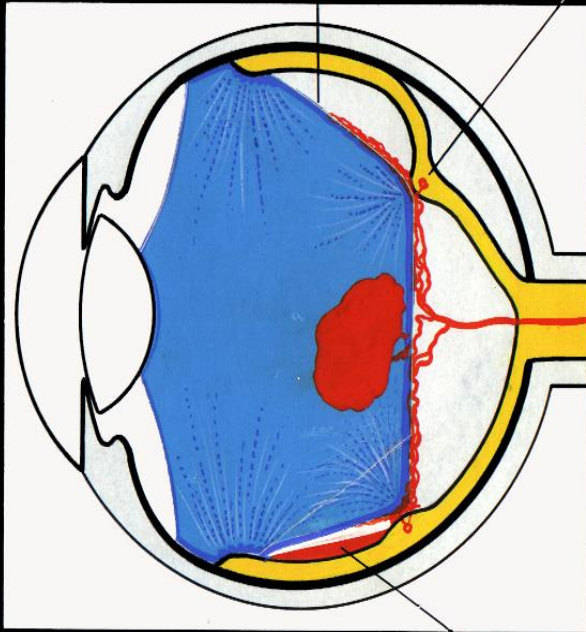
- Convex, deep mobile elevation extending to ora serrata
- Slightly opaque with dark blood vessels



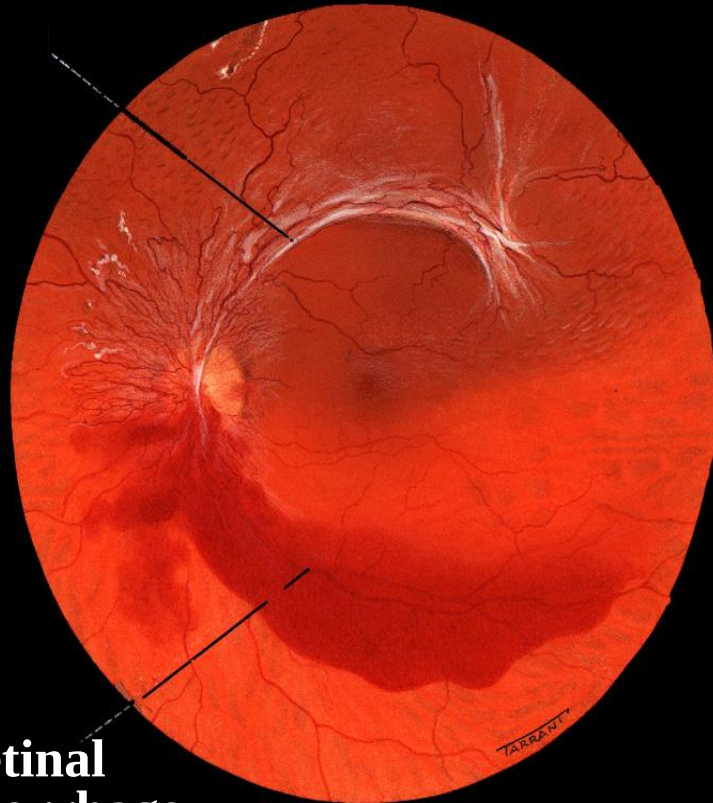
- Loss of choroidal pattern
- Retinal breaks

Diabetic Tractional RD

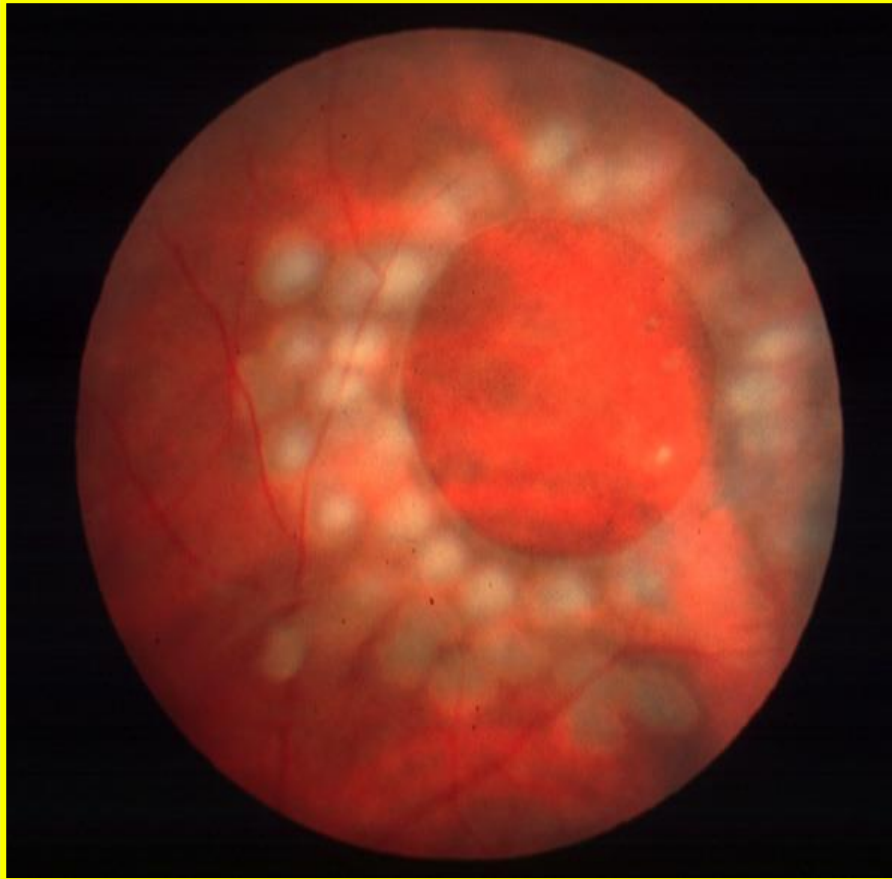
**Antero-posterior
traction**



**Preretinal
haemorrhage**



Prophylactic Argon Laser Photocoagulation

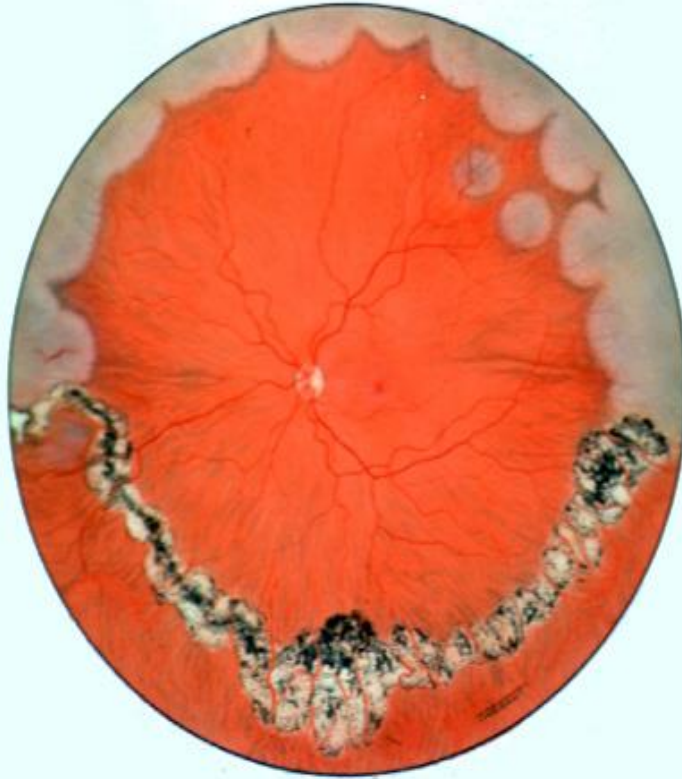


Surround lesion with two rows of confluent burns



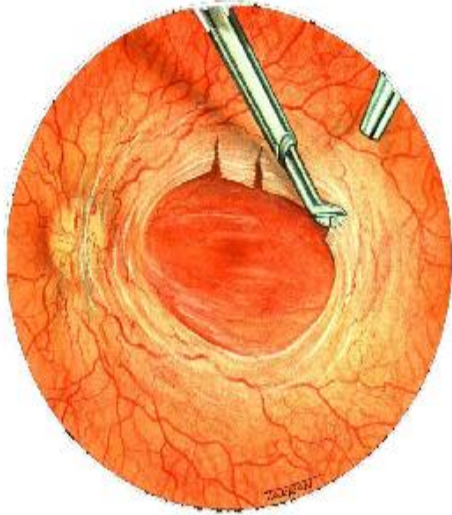
Difficult for anterior lesions and if media hazy

Cryotherapy

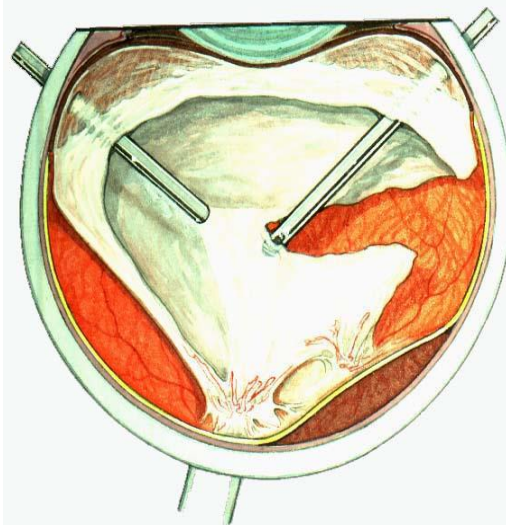


- **Surround lesion with single row of cryo-applications**
- **Preferred for treatment of large areas**

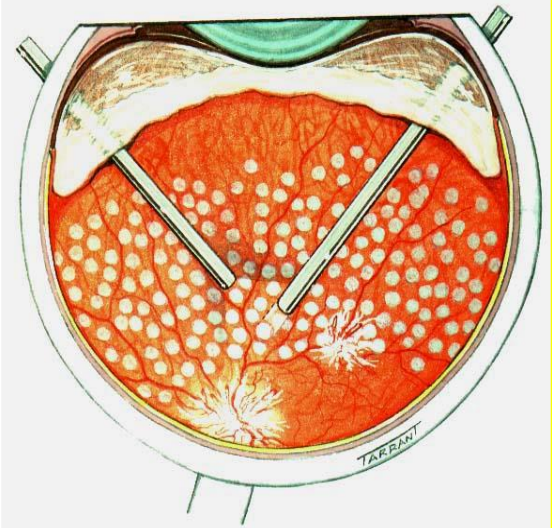
Vitrectomy and Endolaser



Release of circumferential traction

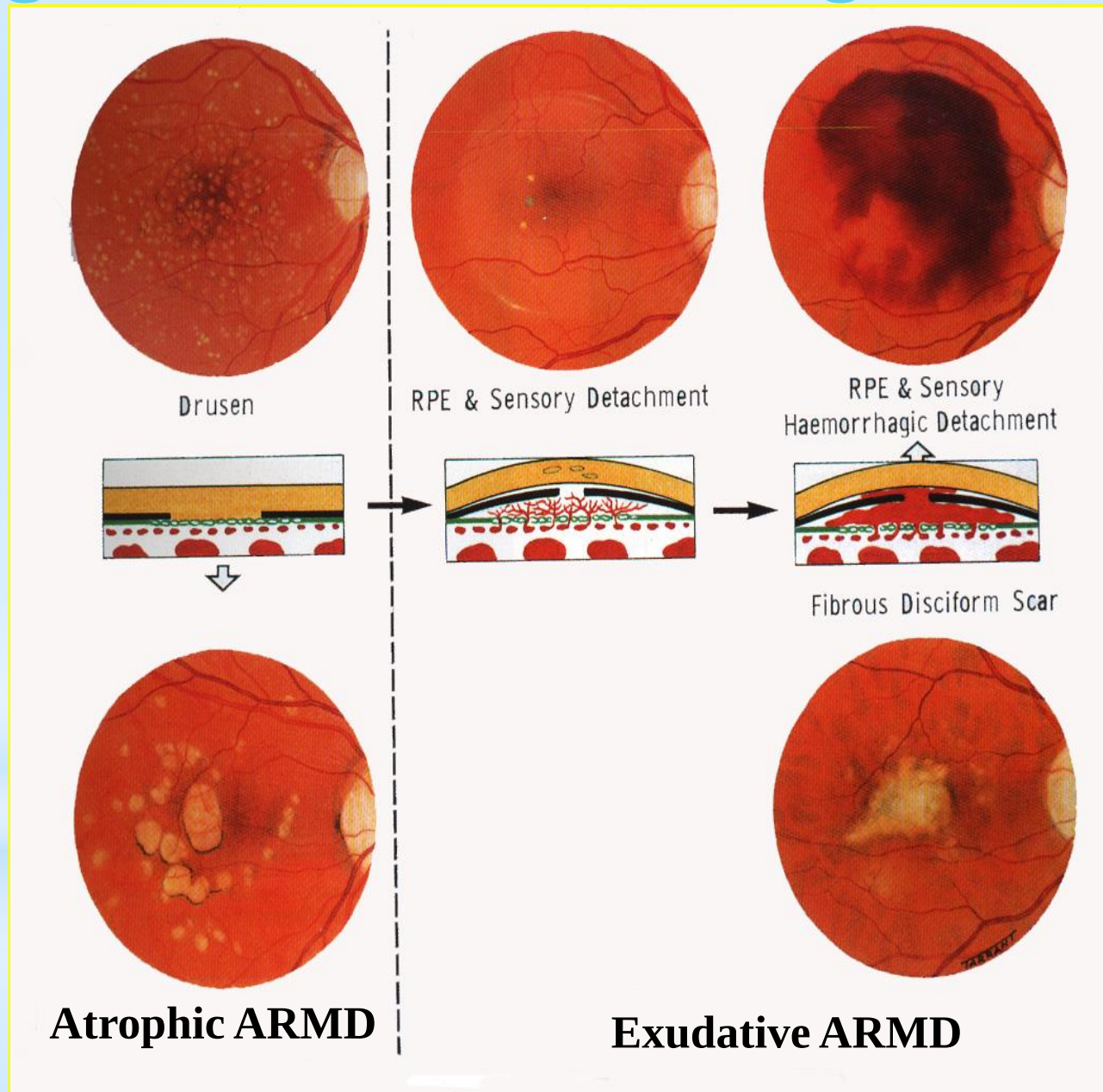


Release of antero-posterior traction



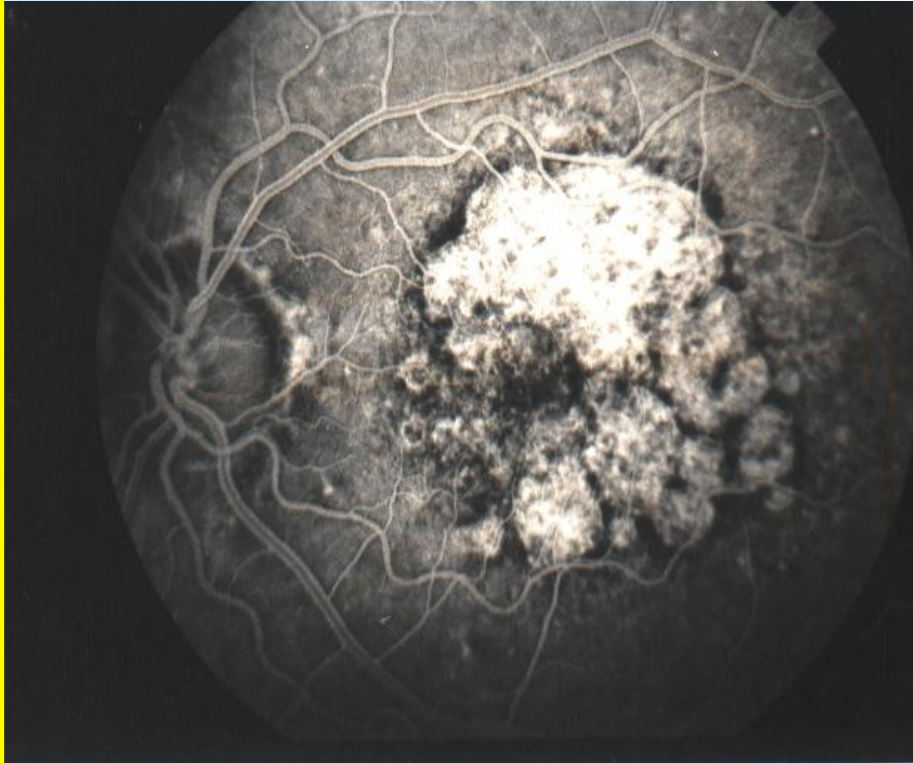
Endophotocoagulation

Age-Related Macular Degeneration



Age-related Macular Degeneration

Fluorescein angiogram



Hyperfluorescence

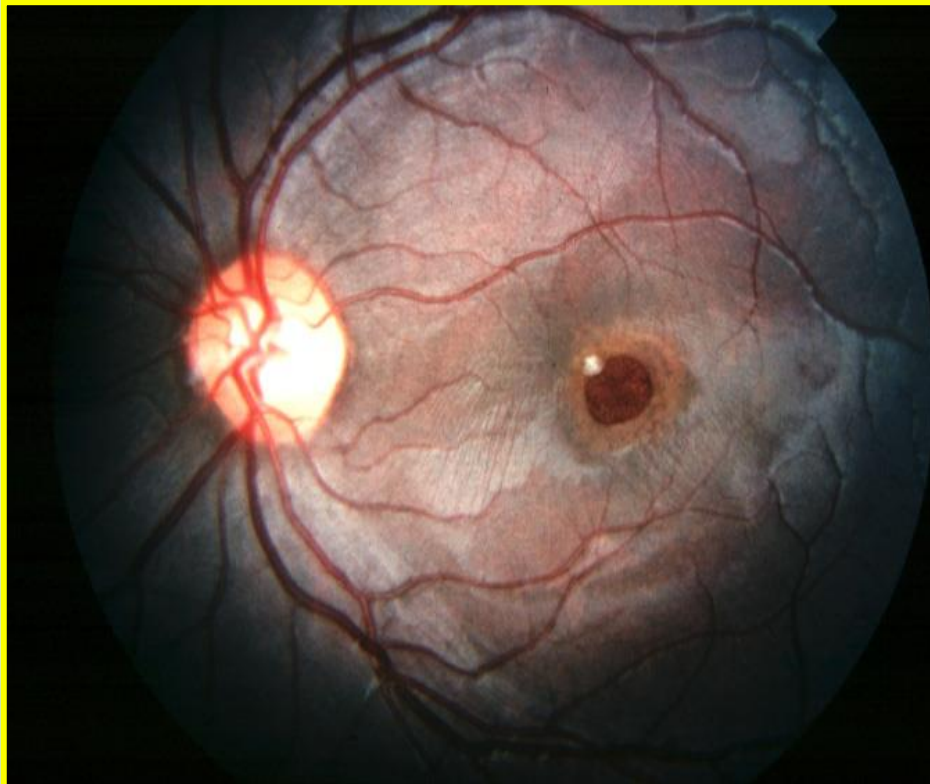
Management



Low-vision aids if appropriate

Clinical features of full-thickness macular hole

- Typically affects elderly females
- Eventually bilateral in 10%

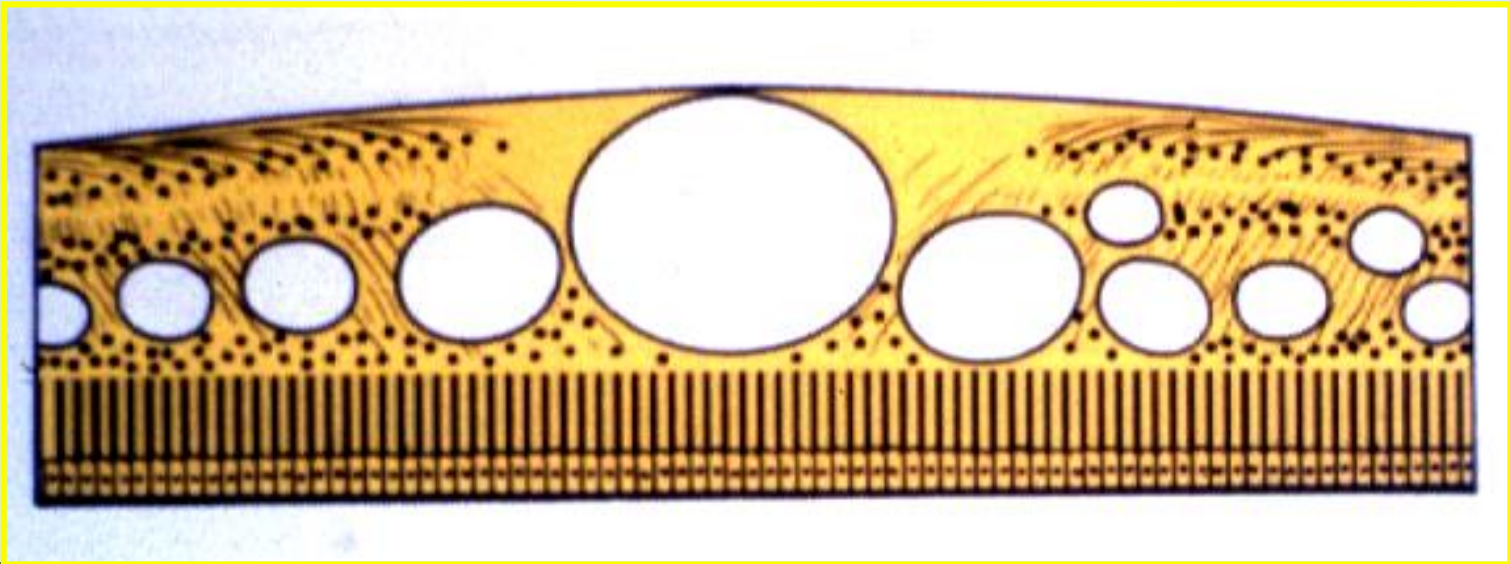


- Round punched-out area at fovea
- Surrounding halo of sub-retinal fluid



Multiple yellow deposits within crater

Cystoid macular oedema (CMO)



Fluid-filled microcysts in outer plexiform and inner nuclear layer

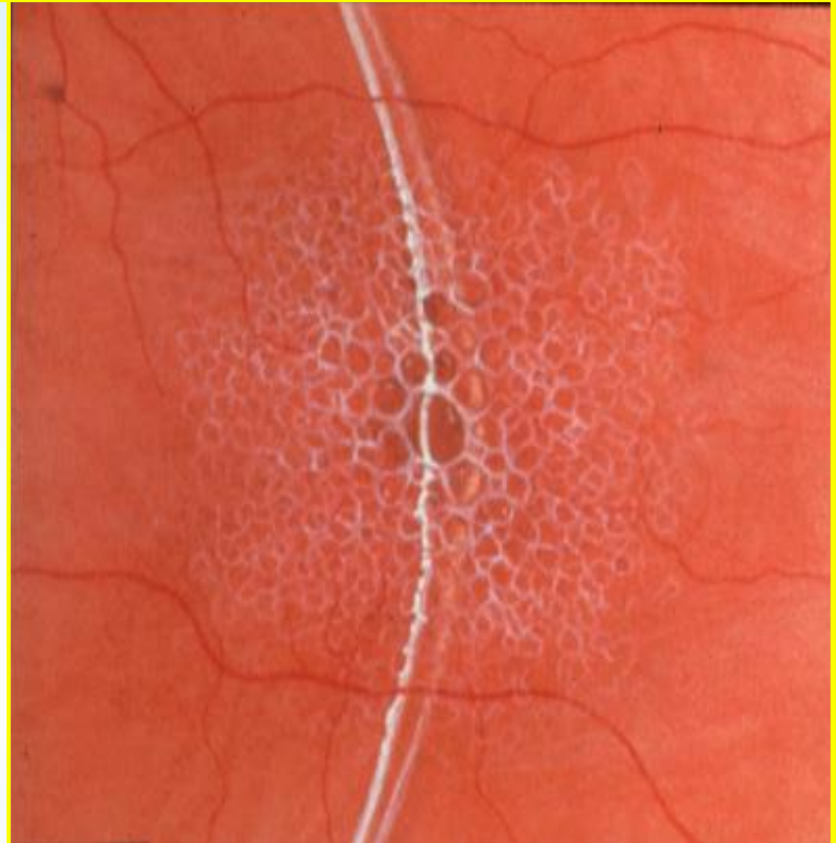


May lead to lamellar hole formation if longstanding

Clinical diagnosis of CMO

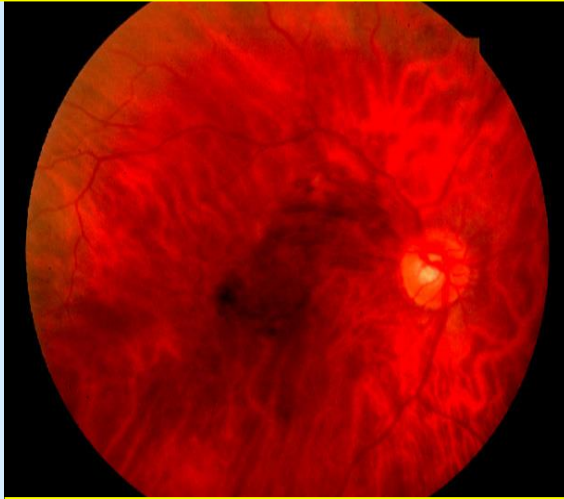


- **Loss of foveal depression**
- **Yellow spot at foveola**



- **Retinal thickening**
- **Multiple cystoid areas**

Important causes of CMO



Retinal vein occlusion



Background diabetic retinopathy



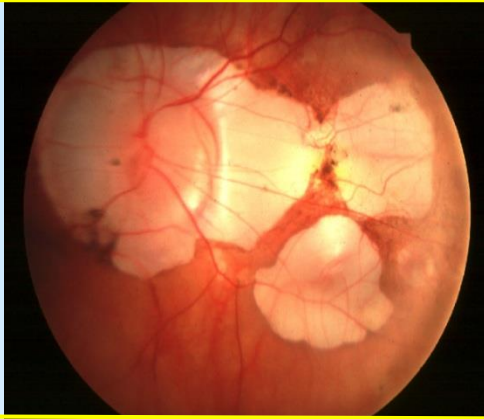
Post-cataract surgery



Intermediate uveitis

Myopic maculopathy

Atrophic



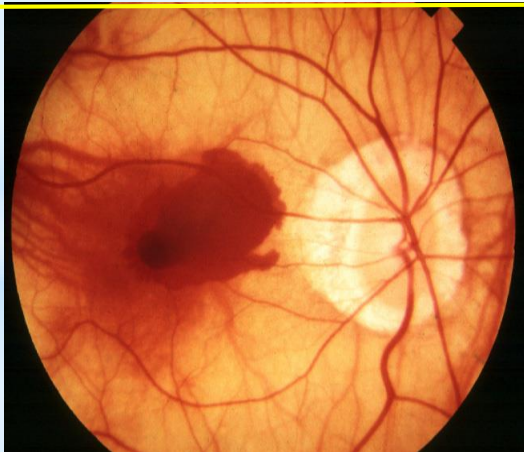
Progressive chorioretinal atrophy
May be associated with macular hole

‘Lacquer cracks’



Large breaks in Bruch membrane
Develop in about 5% of highly myopic eyes

Macular haemorrhage



- From CNV with lacquer cracks
- From lacquer cracks alone

Fuchs spot



- Secondary pigment proliferation
- Follows absorption of blood

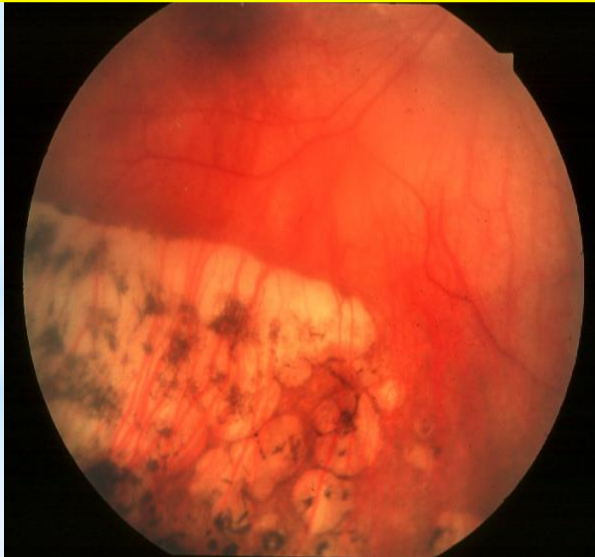
Other fundus changes in myopia



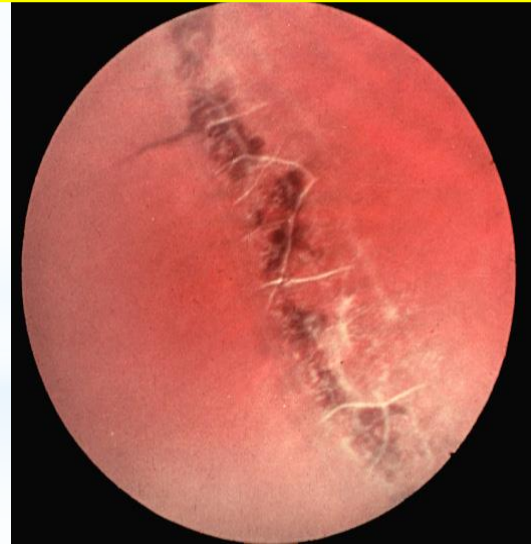
Tilted disc



Posterior staphylomas



Peripheral chorioretinal degeneration



Lattice degeneration, holes and retinal detachment

Retinitis Pigmentosa

1. Inheritance

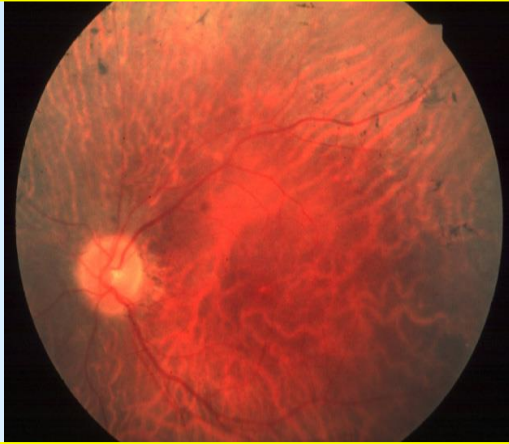
- Sporadic (23%)
- Dominant (43%)
- Recessive (20%)
- X-linked recessive (8%)
- Uncertain (6%)

2. Presents - usually prior to 30 years

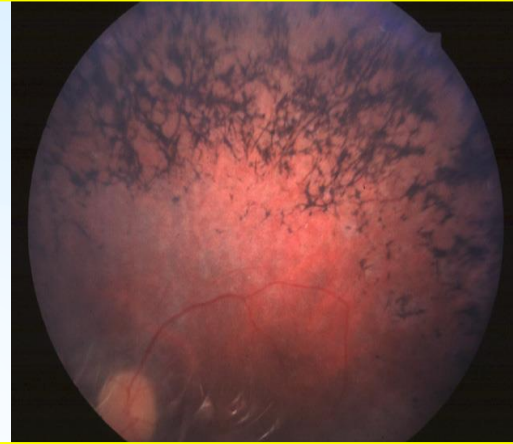
3. Prognosis - dominant worst, x-linked best

4. ERG - reduced

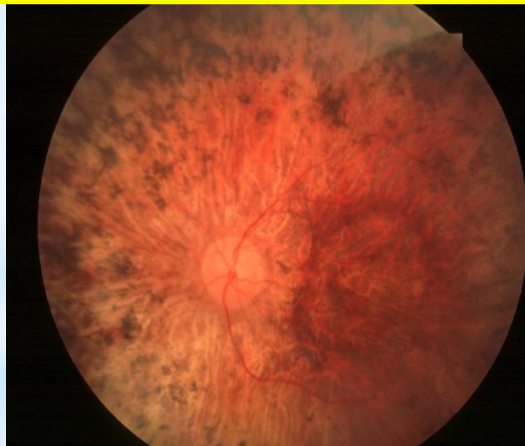
Progression of Retinitis Pigmentosa



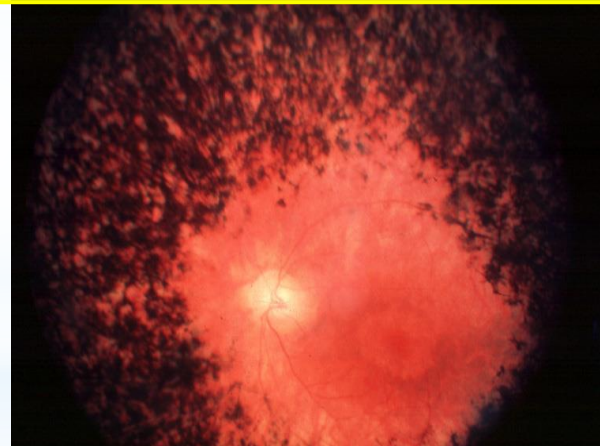
- Fine dust-like pigmentation
- Arteriolar attenuation



- 'Bone-spicule' pigmentation



- Unmasking of large choroidal vessels



- Optic disc pallor
- Maculopathy

SQUINT

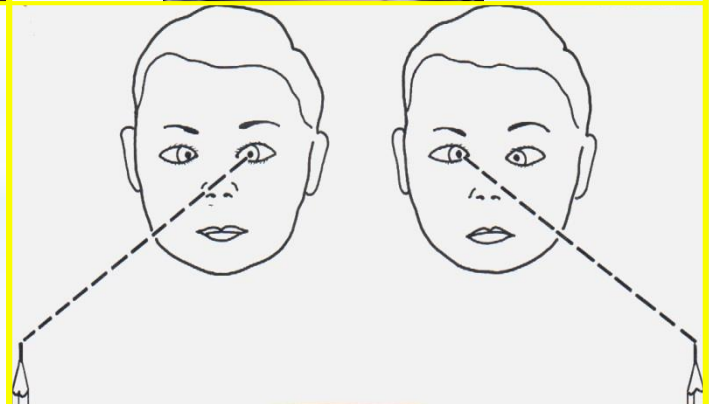
Essential infantile esotropia

Presents within first 6 months

Signs



- **Angle large and stable**
- **Nystagmus in some cases**
- **Normal refraction for age**
- **Poor potential for BSV**
- **Amblyopia in about 30%**



• **Cross fixation**

Management of essential infantile esotropia



- Correct amblyopia if present
- Surgery before age 12 months



- Bilateral medial rectus recessions

Constant exotropia

Congenital



- Presents at birth
- Large angle
- Alternating fixation
- Normal refraction for age

Sensory



- Disruption of binocular reflexes by acquired lesions, such as cataract

Consecutive - follows previous surgery for esotropia

Presentations of retinoblastoma



• Leukocoria - 60%



• Strabismus - 20%



• Secondary glaucoma



• Anterior segment invasion

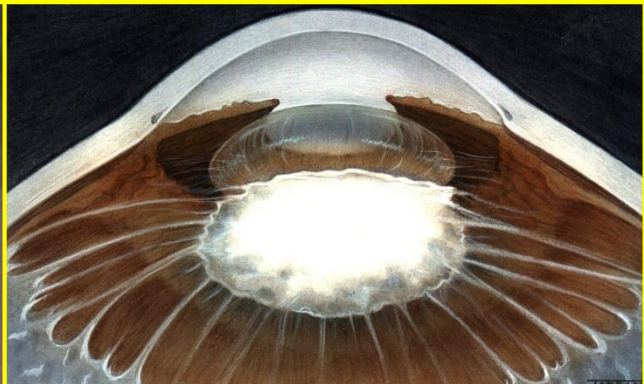
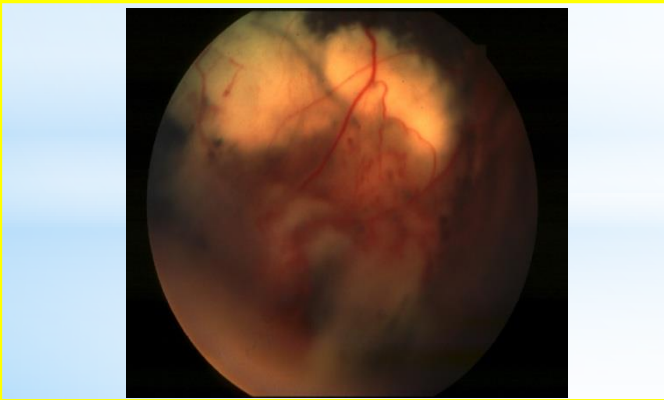
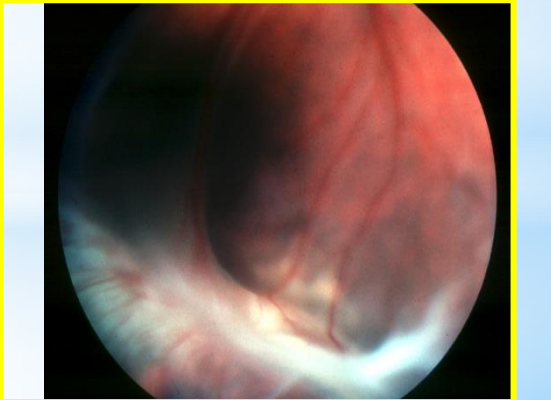


• Orbital inflammation



• Orbital invasion

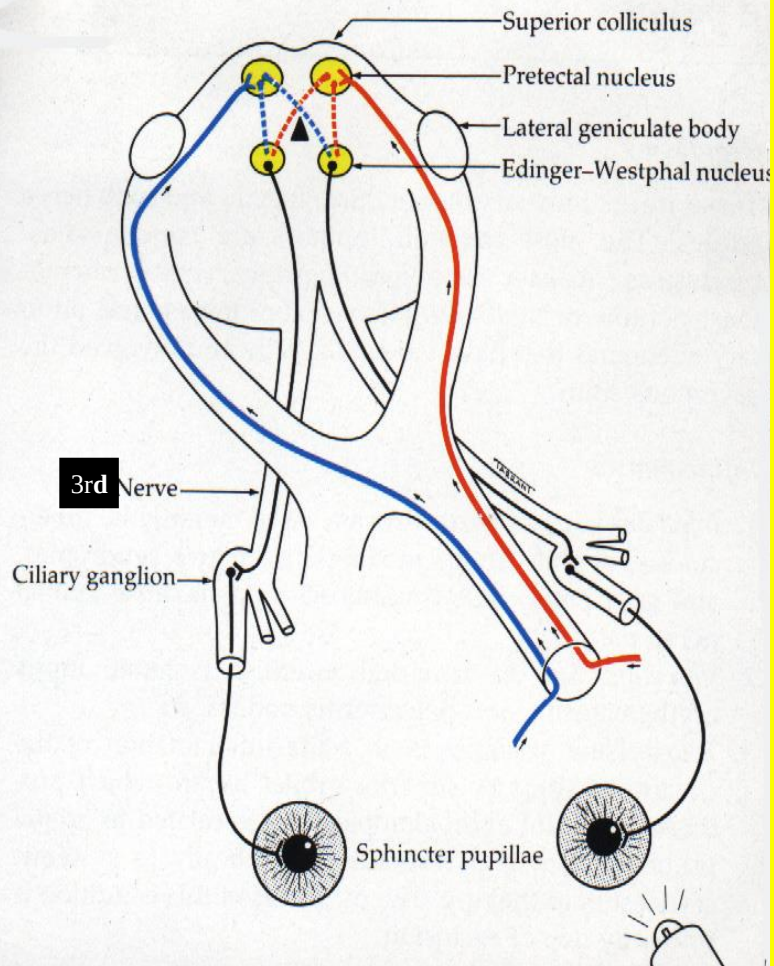
Differential diagnosis of leukocoria

Congenital cataract	Persistent hyperplastic primary vitreous	Inflammatory cyclitic membrane
		
Unilateral or bilateral	Unilateral	Unilateral or bilateral
Coats disease	Posterior pole toxocara granuloma	Advanced retinopathy of prematurity
		
Unilateral	Unilateral	Always bilateral but may be asymmetrical

NEURO-OPHTHALMOLOGY

Applied anatomy of afferent conduction defect

Anatomical pathway



Signs

- **Equal pupil size**
- **Light reaction**
 - ipsilateral direct is absent or diminished
 - consensual is normal
- **Near reflex is normal in both eyes**
- **Total defect (no PL) = amaurotic pupil**
- **Relative defect = Marcus Gunn pupil**

Optic disc changes

Normal



- Retrobulbar neuritis
- Early compression

Swelling



- Papilloedema
- Papillitis and neuroretinitis
- AION

Atrophy



- Postneuritic
- Compression
- Hereditary optic atrophies

Superficial temporal arteritis



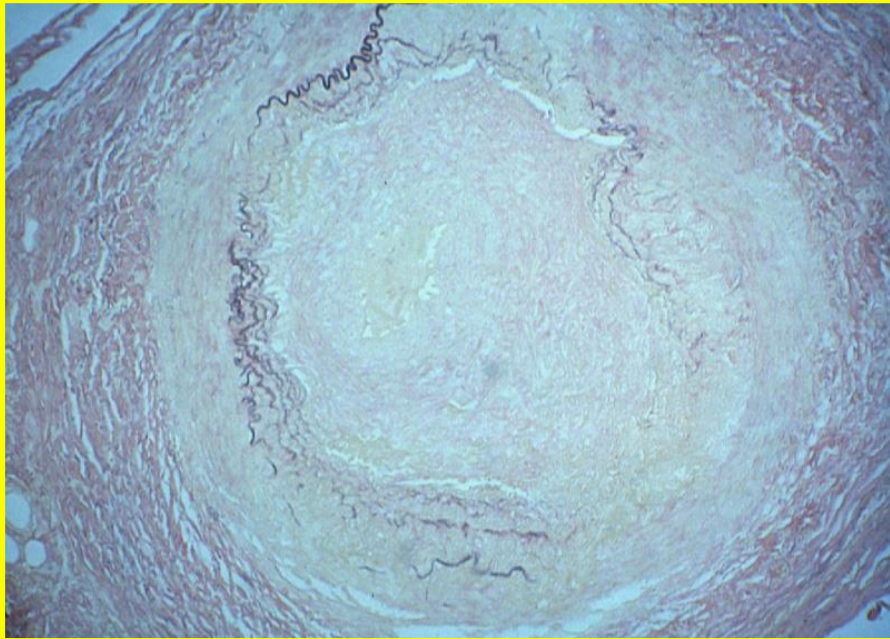
Presentation

- Age - 65-80 years
- Scalp tenderness
- Headache
- Jaw claudication
- Polymyalgia rheumatica
- Superficial temporal arteritis
- Acute visual loss

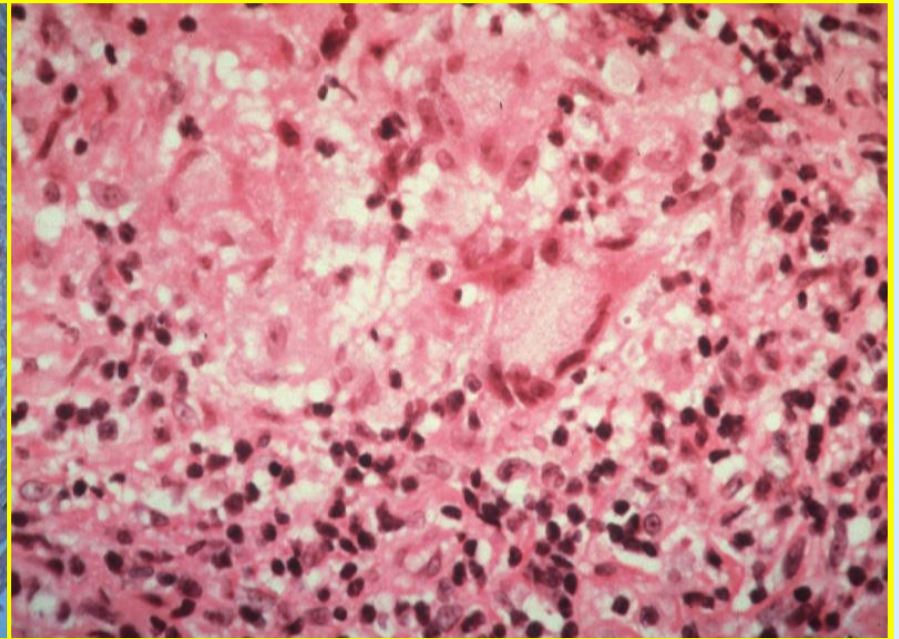
Special investigations

- ESR - often > 60 , but normal in 20%
- C-reactive protein - always raised
- Temporal artery biopsy

Histology of giant cell arteritis



- **Granulomatous cell infiltration**
- **Disruption of internal elastic lamina**
- **Proliferation of intima**
- **Occlusion of lumen**



- **High-magnification shows giant cells**

Early Papilloedema



- **VA - normal**
- **Mild disc hyperaemia**
- **Indistinct disc margins - initially nasal**
- **Mild venous engorgement**
- **Normal optic cup**

Established Papilloedema (acute)



- **VA - usually normal**
- **Severe disc elevation and hyperaemia**
- **Very indistinct disc margins**
- **Obscuration of small vessels on disc**
- **Marked venous engorgement**

Longstanding Papilloedema (chronic)



- **VA - variable**
- **Marked disc elevation but less hyperaemia**
- **Disc margins - indistinct**
- **Variable venous engorgement**
- **Absent optic cup**

Atrophic papilloedema (secondary optic atrophy)



- **VA - severely decreased**
- **Mild disc elevation**
- **Indistinct disc margins**
- **Disc pallor with few crossing vessels**
- **Absent optic cup**

OCULAR TRAUMA

Orbital floor blow-out fracture



- **Periocular ecchymosis and oedema**
- **Infraorbital nerve anaesthesia**



- **Ophthalmoplegia - typically in up- and down-gaze (double diplopia)**



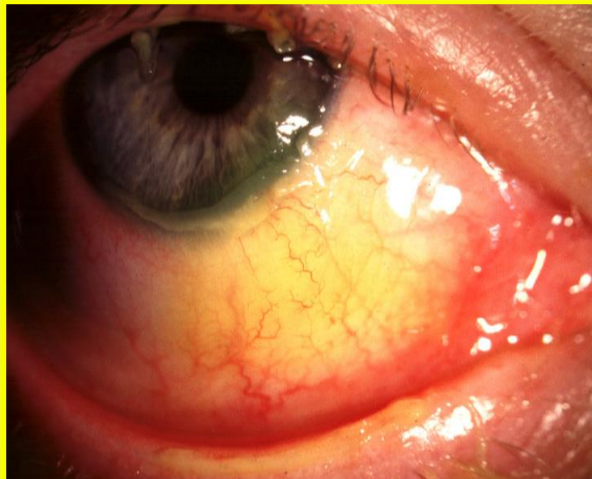
- **Enophthalmos - if severe**

Grading of severity of chemical injuries

Grade I (excellent prognosis)

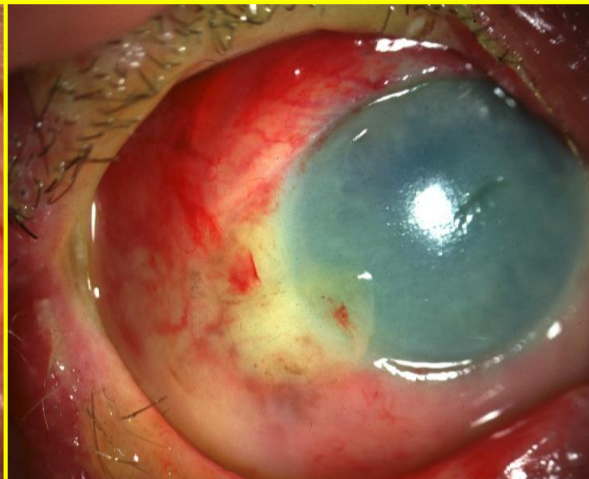
- Clear cornea
- Limbal ischaemia - nil

Grade II (good prognosis)



- Cornea hazy but visible iris details
- Limbal ischaemia $< 1/3$

Grade III (guarded prognosis)



- No iris details
- Limbal ischaemia – $1/3$ to $1/2$

Grade IV (very poor prognosis)



- Opaque cornea
- Limbal ischaemia $> 1/2$

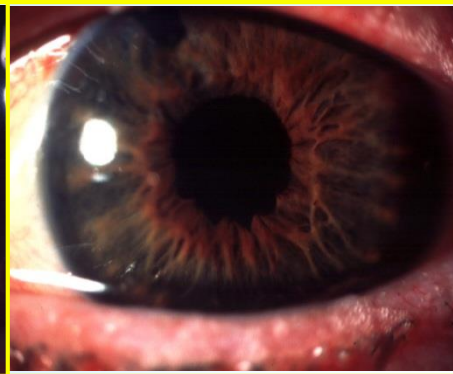
Medical Treatment of Chemical Injuries

1. **Copious irrigation (15-30 min) - to restore normal pH**
2. **Topical steroids (first 7-10 days) - to reduce inflammation**
3. **Topical and systemic ascorbic acid - to enhance collagen production**
4. **Topical citric acid - to inhibit neutrophil activity**
5. **Topical and systemic tetracycline - to inhibit collagenase and neutrophil activity**

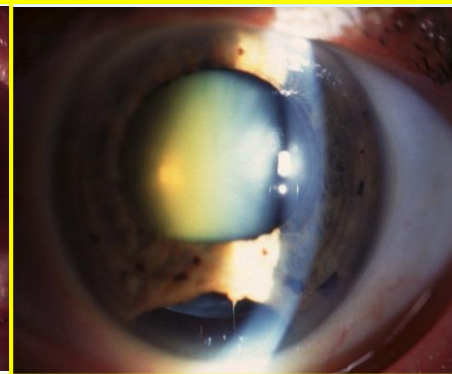
Anterior segment complications of blunt trauma



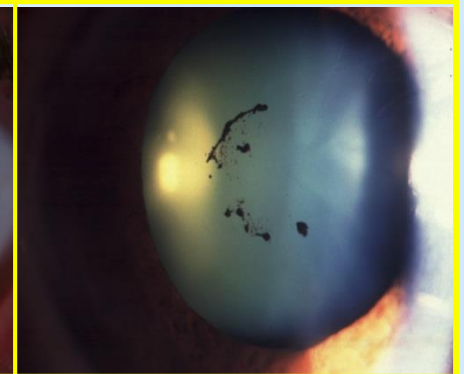
Hyphaema



Sphincter tear



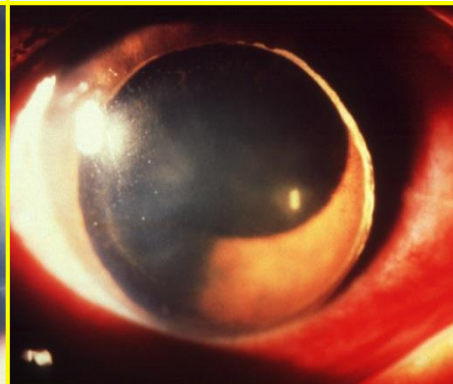
Iridodialysis



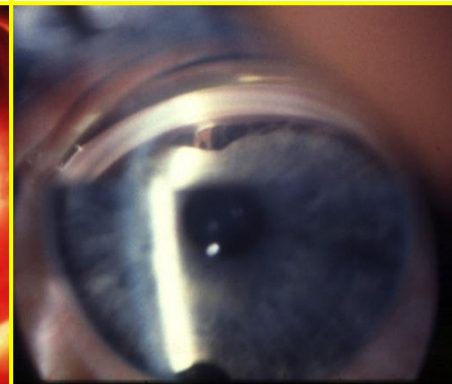
Vossius ring



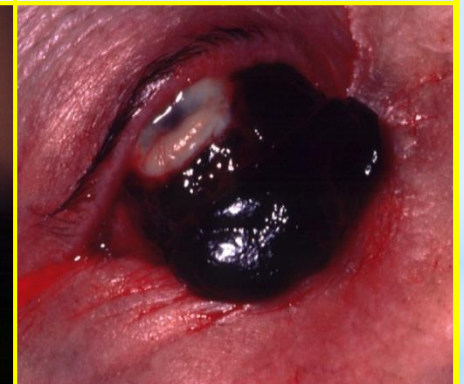
Cataract



Lens subluxation



Angle recession

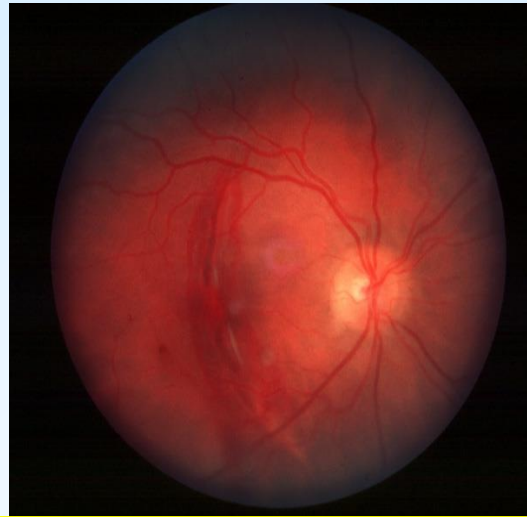


Rupture of globe

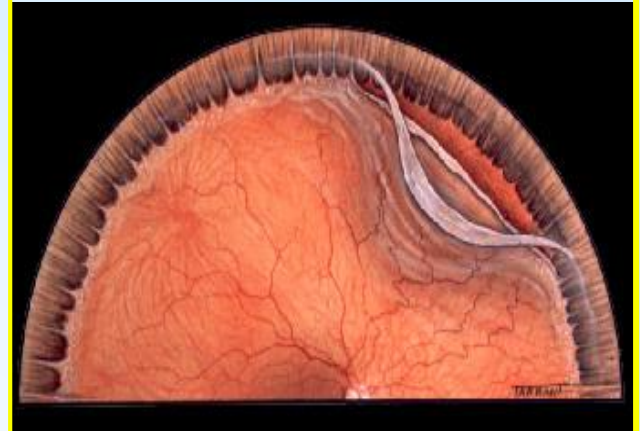
Posterior segment complications of blunt trauma



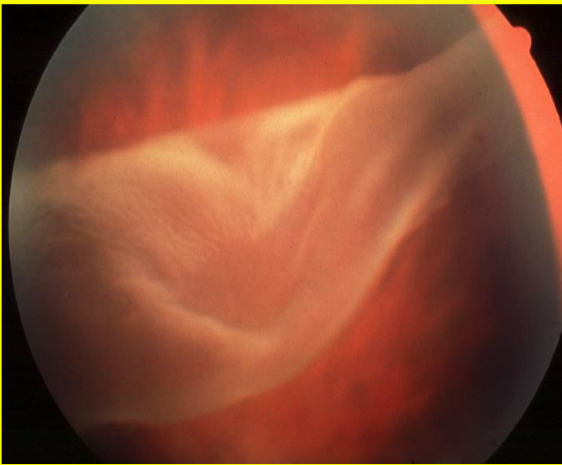
Commotio retinae



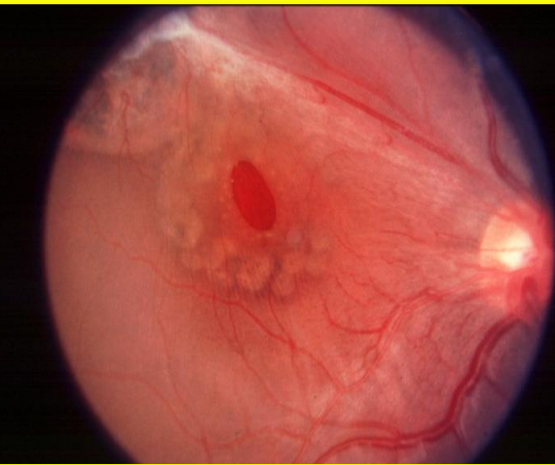
**Choroidal rupture and
haemorrhage**



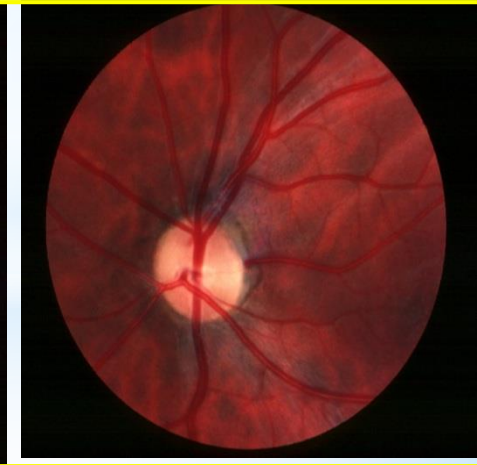
**Avulsion of vitreous base
and retinal dialysis**



Equatorial tears

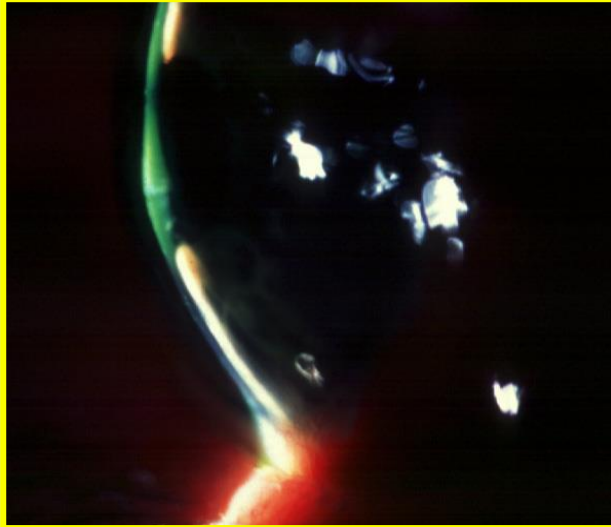


Macular hole



Optic neuropathy

Complications of penetrating trauma



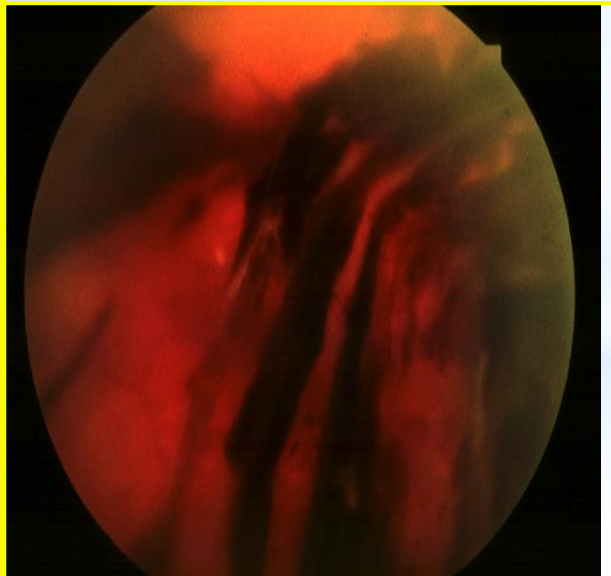
Flat anterior chamber



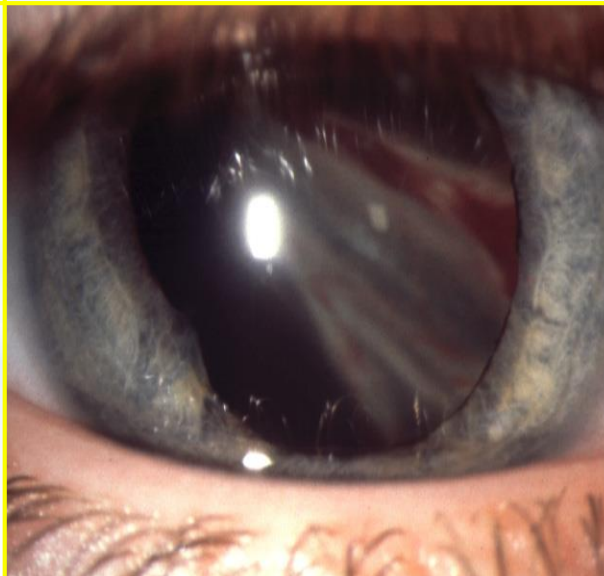
Uveal prolapse



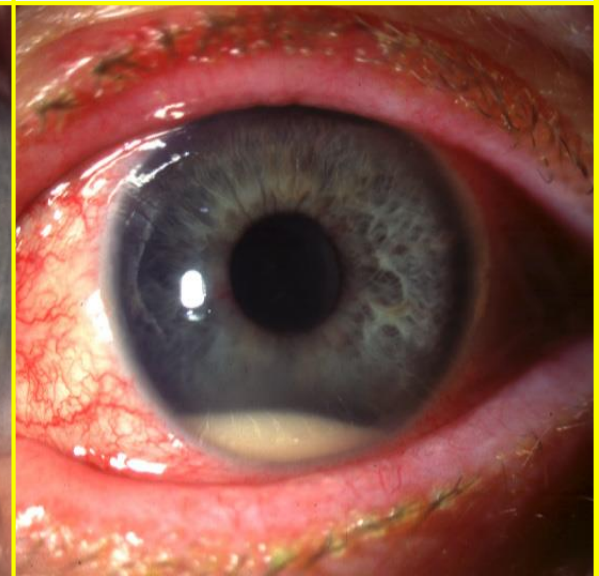
Damage to lens and iris



Vitreous haemorrhage



Tractional retinal detachment



Endophthalmitis